Construction Methods

August 1927

McGraw-Hill Publishing Company, Inc., New York, N. Y.

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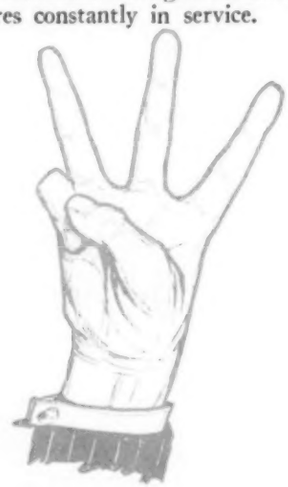

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Construction Methods

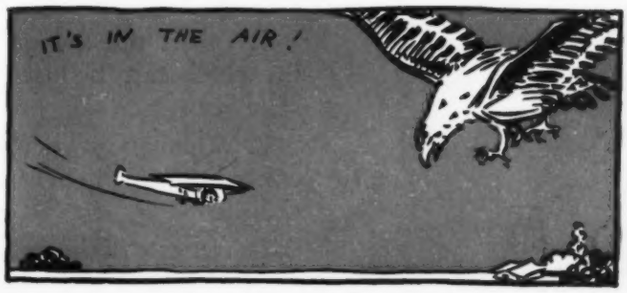
Hitting the High Spots

"WHERE was that taken?" That's the first question that is asked about every picture we print, so when a ridiculously simple method of answering it turns up we are keenly interested. It saves us time and trouble, and although much of the time and trouble we save never does us any particular good, we go right on saving both whenever we get an opportunity. And such an opportunity seems to have turned up.

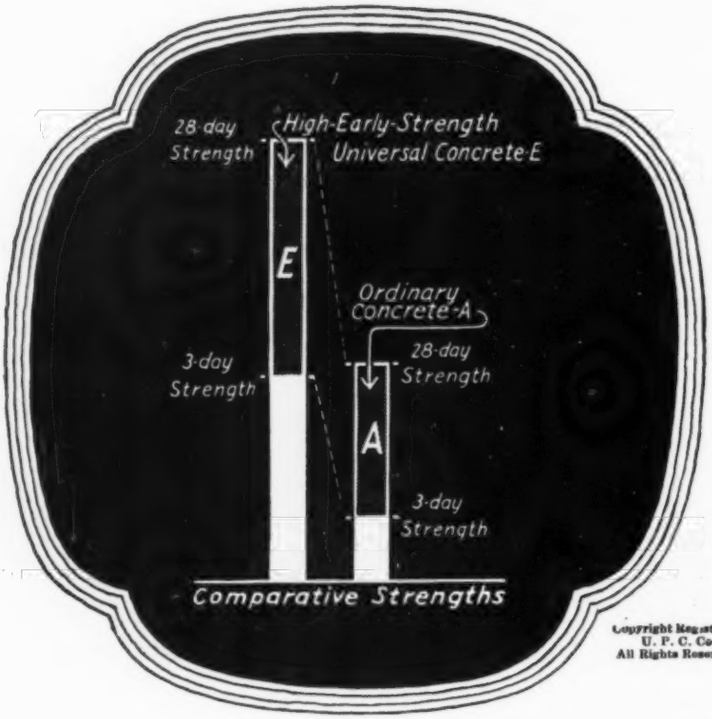
THE new method will be found in two places in this issue. The first is on page 6 where we have an article describing the building of a bridge. Take one look at the Eskimo dog standing beside the track and you know right away that the story comes from Alaska. Then, turn to the first page of the Blue Book (pages 9-12). The moment you catch sight of the patient little burro gazing wistfully over the fence, you do not need to be told that the job is down in Mexico.

HAVING made such a fine start, we expect to continue the good work, and as most of our really worthwhile articles come from our readers, we hereby serve notice that henceforth we want pictures labeled and located by the animal method. We shall refuse to consider any pictures from Florida unless they have an alligator somewhere in view, and if our good friend, Jim Donaghey of Wisconsin, wants us to print any photograph of his justly famous highways he will have to persuade a badger to perch on a stump by the roadside.

IN addition to our animals we have plenty of other good stuff in this issue. There is roadbuilding in New York, New Mexico and London; building construction in Texas and Chicago; a reminder that safety is paramount if the great construction industry is to progress as it should; an extremely well-equipped sand and gravel plant in Virginia; a smooth-working contracting organization in which loyalty and enthusiasm go hand in hand; emergency railway work in flooded Louisiana—in short, a cross-section of the construction industry, and after all, that is a pretty big order.



JUST a suggestion before we stop. On page 3 you will find some aviation pictures. They are there to call attention to the fact that the great flood of interest in flying should bring with it opportunities for construction men. The modern aviator isn't content to land in any old field. That day is past. The construction industry has a chance to show what it can do toward making landing conditions better and safer for the men of the air.



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A Monthly Pictorial of Field Practice and Equipment Illustrating Successful Construction, Maintenance and Material-Handling Methods for General Construction, Highways, Buildings, Industrial Plants and Public Works and Utilities

WILLIAM JABINE
Editor

VOLUME 9 | NEW YORK, AUGUST, 1927 | Number 8

Aviation and Construction

THE construction industry is beginning to do its full share in the development of aviation. Modern air ports are being built in every section of the world and the air port of today requires various buildings, as well as the most careful grading, all of which offers an opportunity for construction men. Recently it was announced that within a period of sixty days thirty-one new air fields and air ports were to be dedicated in the United States.

The two photographs of the Templehof Air Port were obtained by E. J. Mehren, Vice-President of the McGraw-Hill Publishing Co., who has been in Europe for the purpose of attending important international economic conferences.

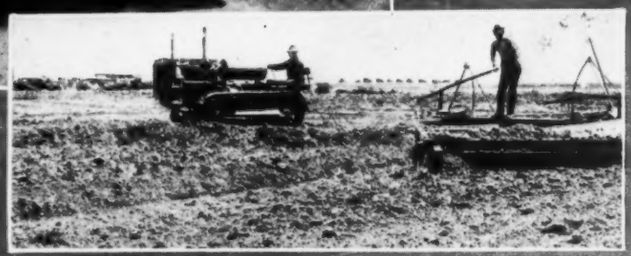
Below—Radio and wind direction towers at the Templehof Air Port, Berlin. Such structures are an integral part of a modern air port

At left—One of the big German Dornier seaplanes operated on the Stettin-Stockholm route which accommodates ten passengers

At right — General view of the Templehof Air Port at Berlin which is the terminus of air routes to all parts of Germany and other European capitals

Above—A group of executives of one of the biggest airplane corporations in the United States using an airplane on an inspection trip

© *P. & A.*



At right — Caterpillar tractor grading the field at the municipal air port, Oakland, Calif., and constructing the 7,000-ft. runway 150 ft. in width which was used by Lieuts. Maitland and Hagenberger for the hop-off to Honolulu

Looking Around at Home

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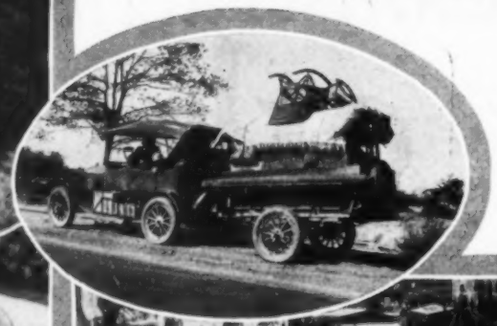
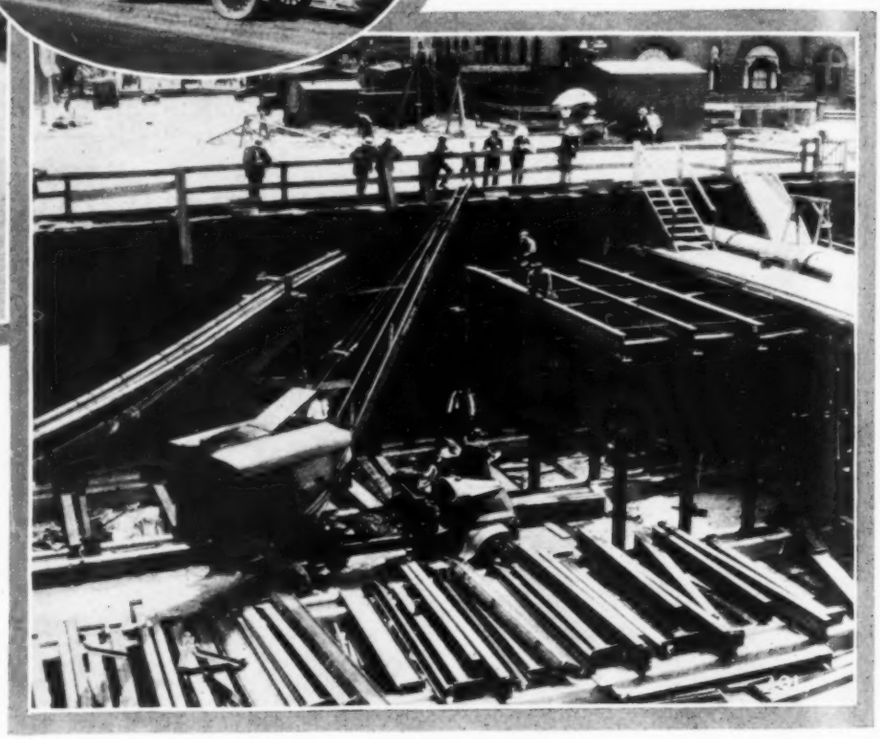
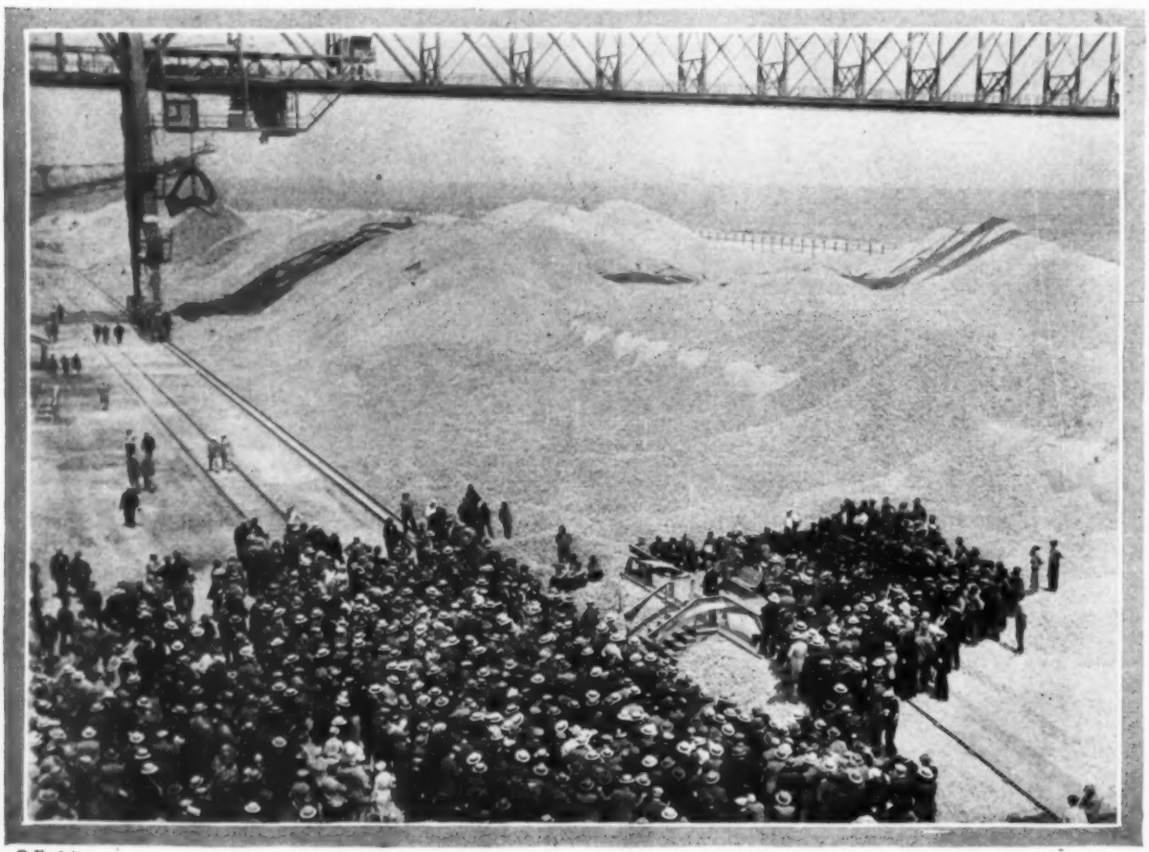
Above—A newcomer to highway maintenance is the glass patrol maintained in California by the California State Automobile Association



At left—R. A. Trufant, Illinois highway engineer, on his way with family and household equipment to take up cranberry bog construction on Cape Cod. He carries a copy of *Construction Methods* with him



At right—An early traveler in New York City's new subway on Eighth Ave. was a Universal Crane mounted on a Mack truck which went down into the excavation to handle steel



© U. & U.

At left—The construction industry scores twice in this picture which shows the ceremonial opening of a harbor built to handle construction material. Buffington Harbor, Ind., at the south end of Lake Michigan, has just been completed by the Universal Portland Cement Co., and was opened with formal exercises at which Vice-President Dawes was the chief guest

And a Few Foreign Jobs

©P. & A.

At right—A new machine for boring holes for posts and other purposes has been getting attention in France. This one is headed for a Colonial rubber plantation

© Herbert.

Above—This tractor is working on the new Central highway in Cuba and is shown pulling down trees where a curve is being straightened in Havana Province

At left—A great underground station is being built in London under Piccadilly Circus. This picture was taken in what is known as the pilot tunnel and shows the character of the job

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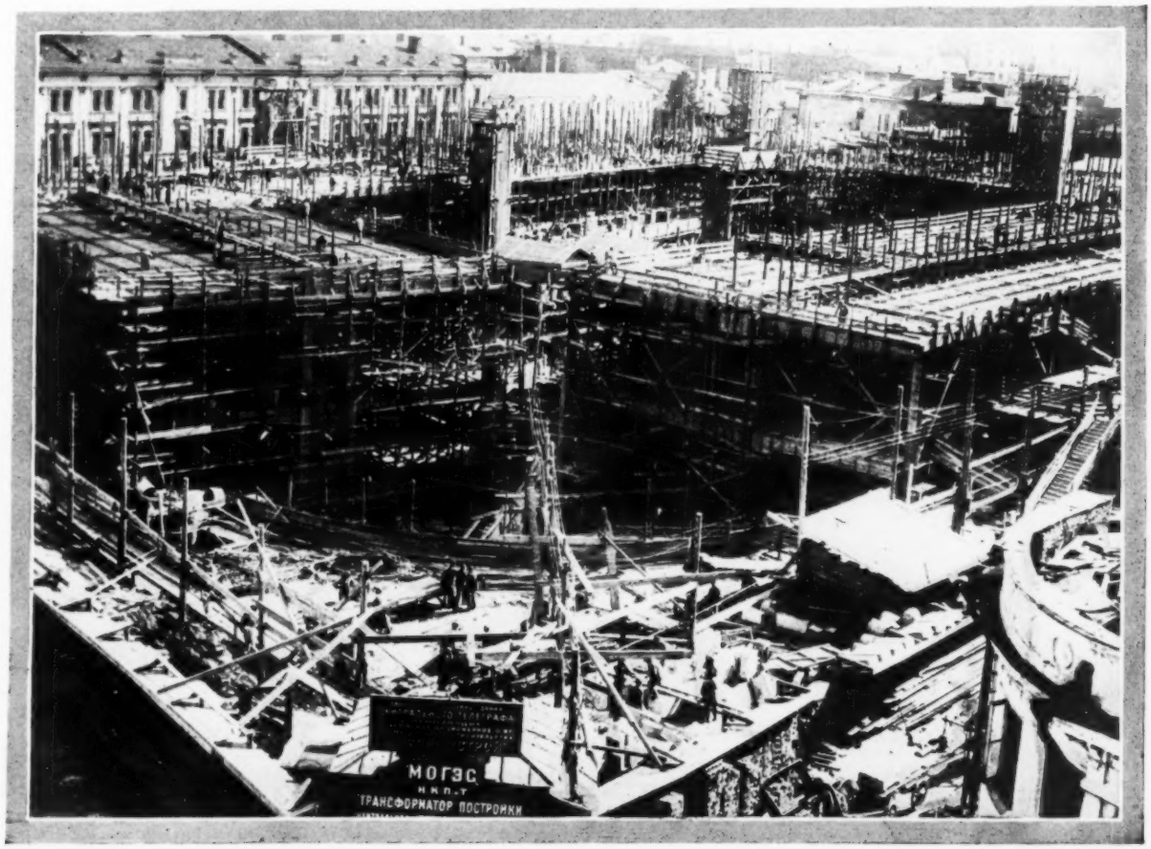


At right — A great building for the postal and telegraph service is being built in Moscow by the Soviet government. This picture shows the new structure under construction. A number of other large buildings also are under way in Moscow, which, in some respects, is becoming much more of a modern city than it was in the past

Where They Work Fast

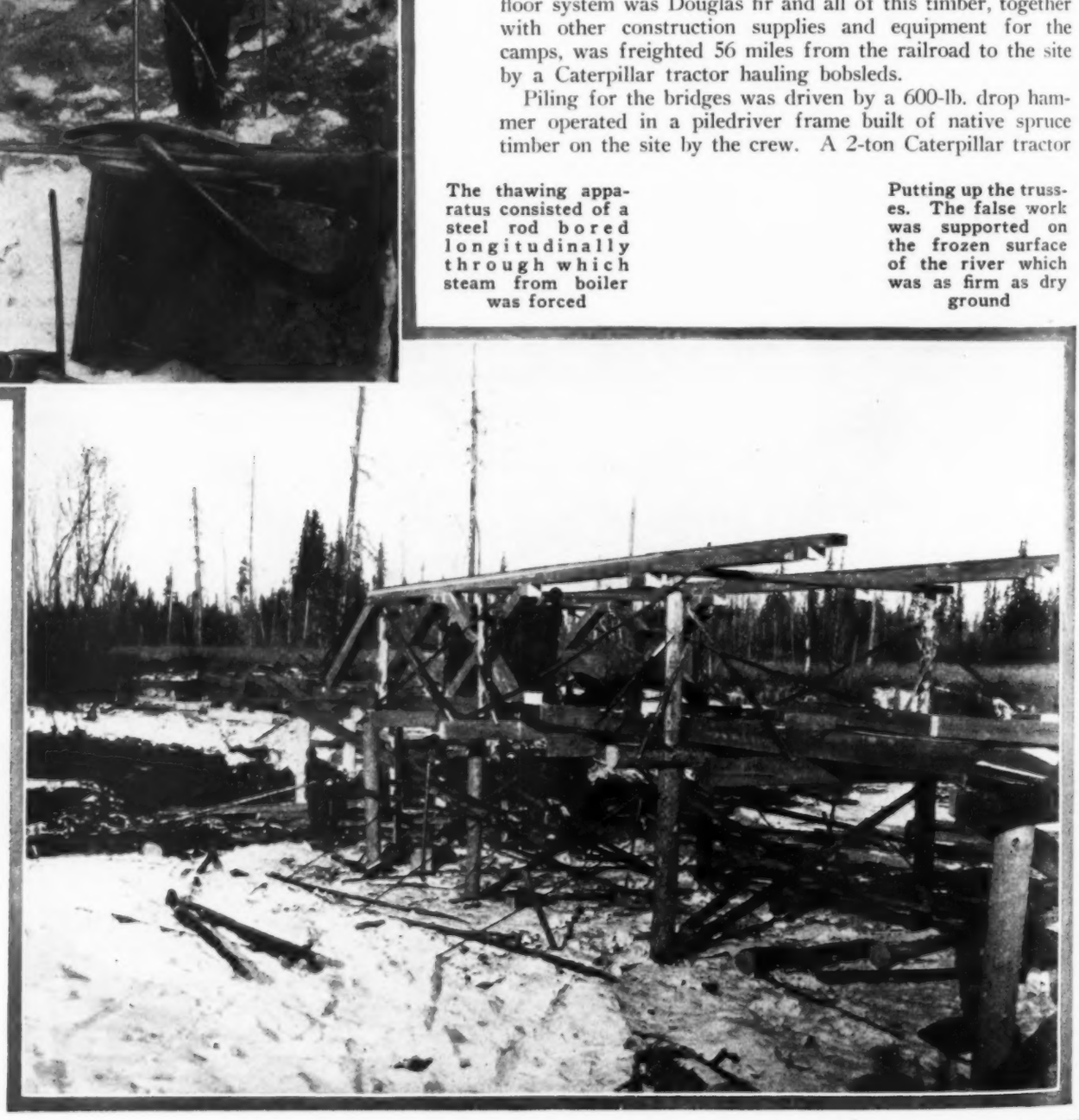
Alaskan Bridge Builders for Finishing

IN SPITE of difficulties such as the necessity of freighting material 56 miles over snow and thawing the ground before driving piles, the Alaska Road Commission recently put up two 60-ft. timber bridges in 26 working days. The entire job was handled by a bridge crew of twelve men under the direction of Ike Hennigar, foreman.

The two bridges were needed on the line of a small tramway operated by the Road Commission at Livengood, and work was done last spring when the temperature ranged from zero to 20 deg. below. A constant north wind added to the severity of the working conditions, but all of the work, including the cutting and the framing of timbers, was done outdoors. The timber used in the trusses and floor system was Douglas fir and all of this timber, together with other construction supplies and equipment for the camps, was freighted 56 miles from the railroad to the site by a Caterpillar tractor hauling bobsleds.

Piling for the bridges was driven by a 600-lb. drop hammer operated in a piledriver frame built of native spruce timber on the site by the crew. A 2-ton Caterpillar tractor

The thawing apparatus consisted of a steel rod bored longitudinally through which steam from boiler was forced



Putting up the trusses. The false work was supported on the frozen surface of the river which was as firm as dry ground

to Keep Warm

Have Excellent Reason Job Quickly

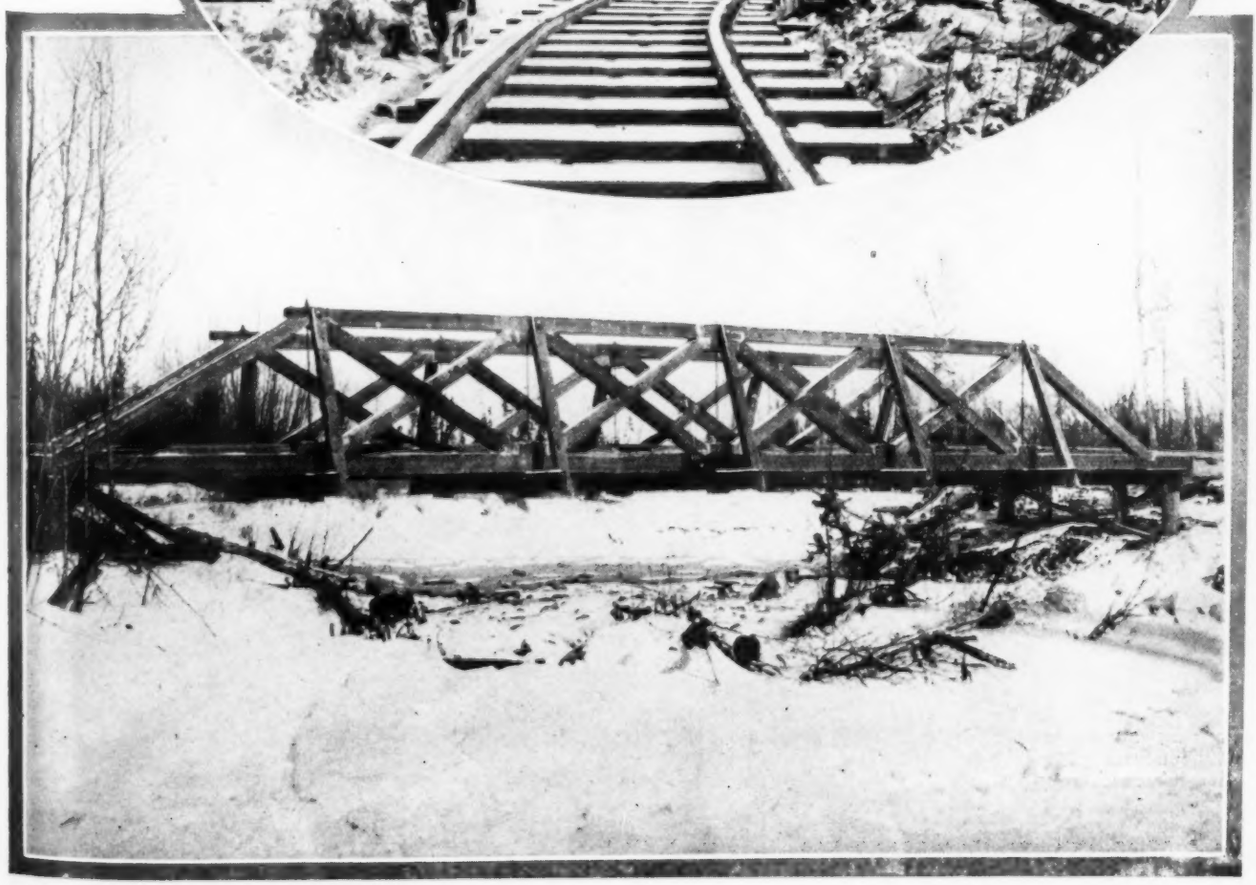
hitched to the hoisting rope furnished the motive power for raising the hammer. Piles were driven to a penetration of about 13 ft. at the rate of about 15 or 20 minutes to a pile. Because of the intense cold all of the ground where the piles were driven first had to be thawed. The thawing apparatus, which is shown in the upper photograph on page 6, consisted of a steel rod 15 ft. in length bored longitudinally with a ¼-in. hole through which steam was forced from a small portable boiler. Four of these rods could be operated simultaneously from the same boiler. They were pounded slowly into the ground, thawing it as they penetrated.

The photographs were taken by John R. Noyes, 2nd Lieutenant, Corps of Engineers, U. S. Army.

Above — The piledriver in operation

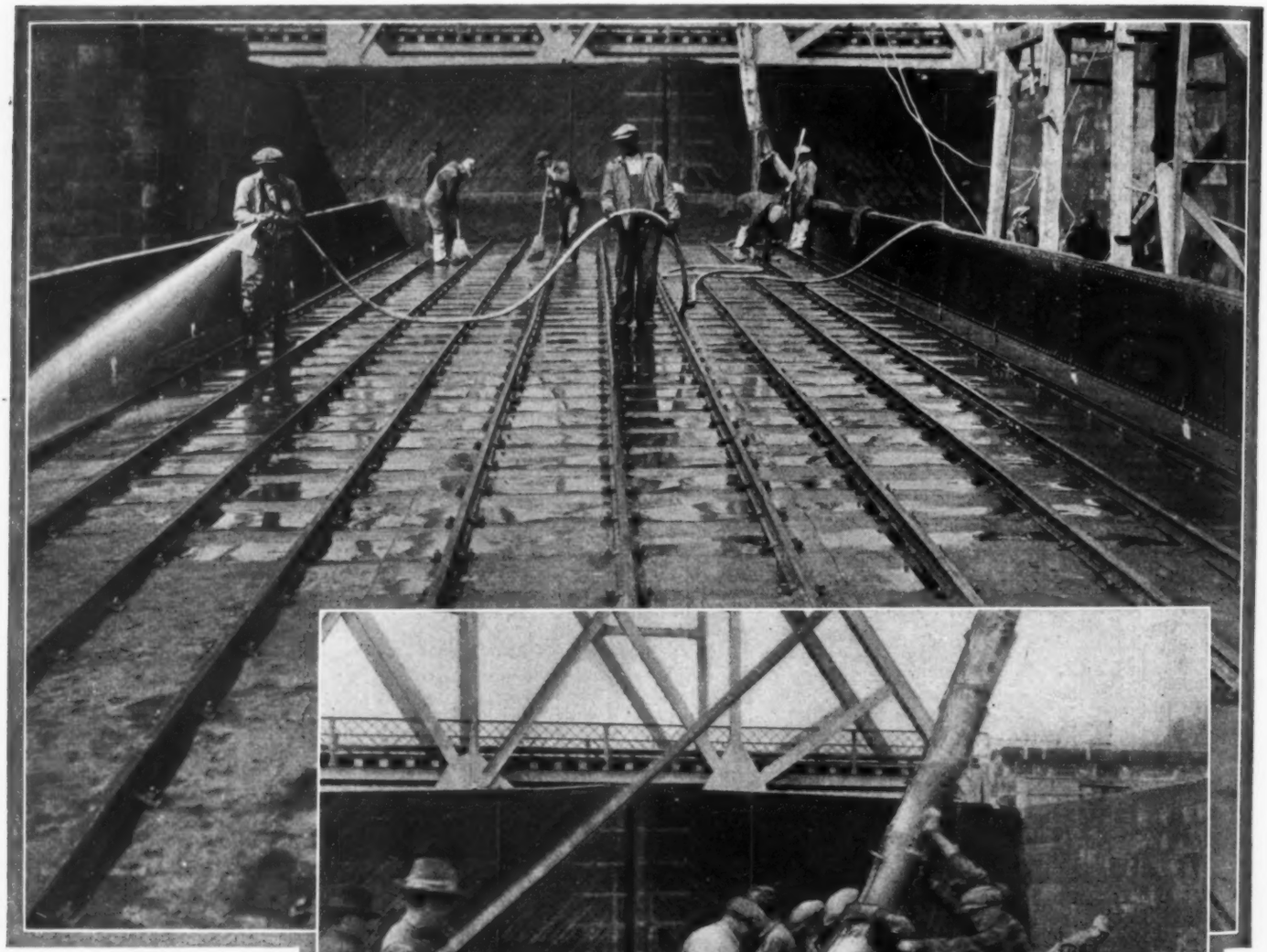
At right—A view of the finished bridge showing wooden rails of tramway — also an Alaskan dog

Below — One of the bridges immediately after completion



New Concrete Deck for Old Steel Barge

THE steel deck of a barge used for transporting sand and gravel on the Ohio River was in bad shape. As the rest of the barge was in good condition, it was decided to put on a concrete deck. Thirty-pound rails were bolted to the old deck. A thin mixture of cement was swept over the deck to act as a bond between the concrete and the steel. Concrete was then poured and finished with a float even with the top of the rails.



Above — Rails in place. Cleaning the old deck before laying the concrete

At right — Pouring and finishing the new concrete deck. The entire job cost only $750

Southern Pacific of Mexico Completes Last Link

For the last four years the Southern Pacific Railroad Co. of Mexico has been building a line between Tepic and La Quemada, a little more than 100 miles in length, which is the last link in opening up a direct route between the Pacific Coast and Mexico City. It will serve a rich territory and provide a better outlet for a number of mines. The Utah Construction Co. of Ogden, Utah, built the new link which was recently opened. Mexican burros were used for handling much of the supplies and materials used on the big job

BLUE BOOK

Southern Pacific of Mexico Completes Last Link

One of the bridges on the new line under construction. This one crosses the Miravalles River. All bridge steel, 95 per cent of the timber and 50 per cent of the cement used was brought in from the United States. There are 32 bridges and viaducts in the 103 miles, the longest being 400 ft.

Southern Pacific of Mexico Completes Last Link

At work on one of the sections where it was necessary to tunnel through the mountains. This photograph gives a good idea of the methods used in this part of the work. There are 31 tunnels with a total length of 26,000 ft. About 300,000 cu.yd. of material were removed in cutting through the hills. Only four of the tunnels were unlined

BLUE BOOK

Southern Pacific of Mexico Completes Last Link

A typical fill made of hand-laid lava where the new railroad passes through the lava beds of Ixtlan is shown at the right. The men below are engaged in quarrying stone for use in lining the tunnels along the route

The chief engineer of the Southern Pacific Railroad Co. of Mexico is E. B. Sloan with headquarters at Empalme, Sonora, Mexico. L. S. Corey was the superintendent in charge of the work for the Utah Construction Co.

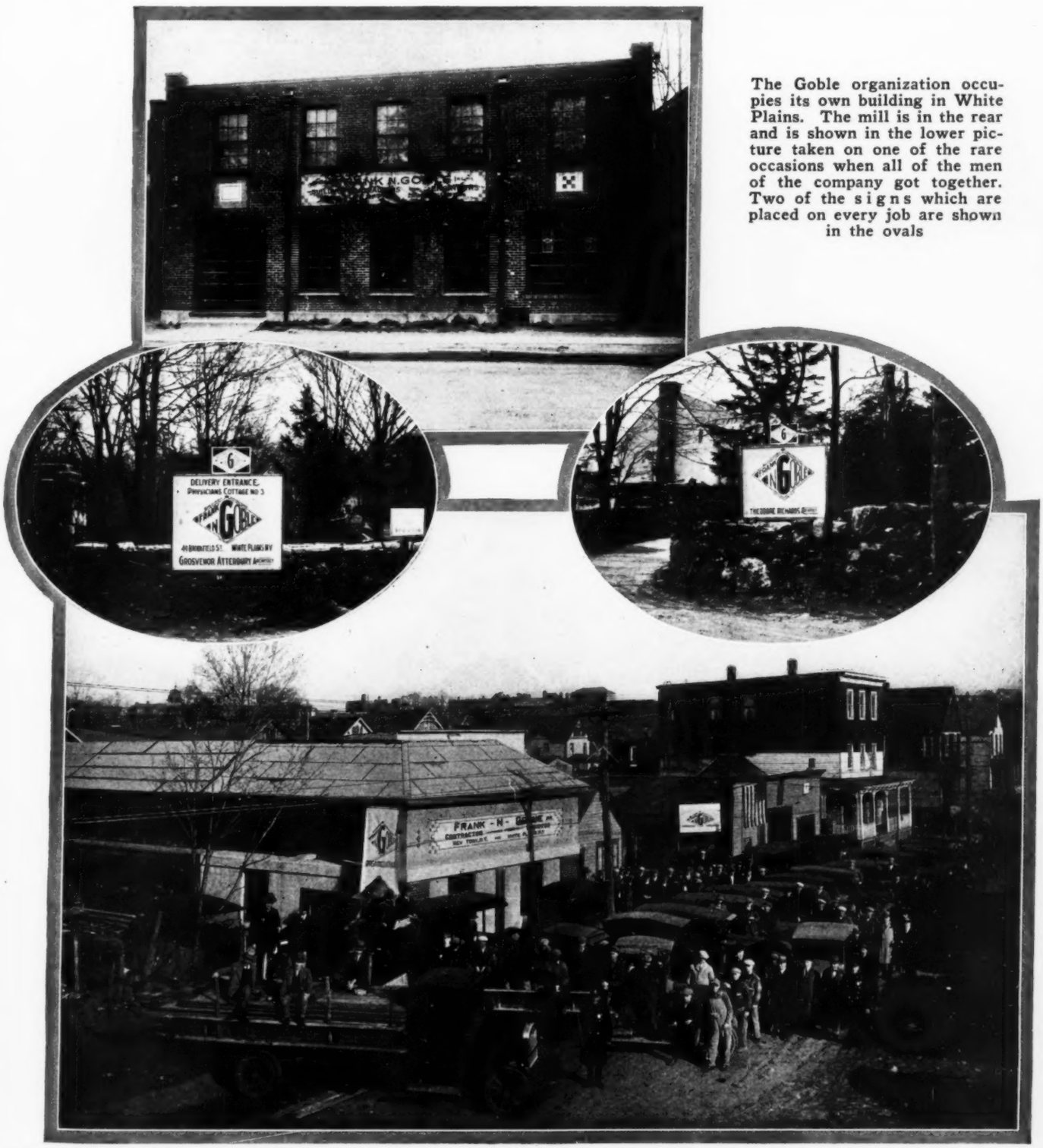
Building an Organization

Goble Men Work in Small Groups but Do Their Thinking as a Unit

MAKING an efficient and enthusiastic unit of an organization of about 100 men, the very nature of whose work demands that they continually be split up into small groups of ten or a dozen, sounds like an impossibility, but it seems that it can be done. Frank N. Goble, Inc., building contractors of White Plains, N. Y., are showing how to do it.

This organization has now been in existence for almost 25 years and most of its work consists of building residences costing from $50,000 up. This means that the men on the company's payroll are continually divided into small groups scattered about, some of them being in other states, and yet, every man of the lot, no matter where he may be working, is a Goble man and does not hesitate to say so. He is proud of it.

Various means have been used to bring about this solid-



The Goble organization occupies its own building in White Plains. The mill is in the rear and is shown in the lower picture taken on one of the rare occasions when all of the men of the company got together. Two of the signs which are placed on every job are shown in the ovals

Residence in Greenwich, Conn., just finished by the Goble company

arity, and one of the chief methods has been a long-standing policy of keeping just as many men as possible on the payroll through the winter season. William J. Goble, President of the company, who is in active charge of the work since the retirement of his brother, Frank N. Goble, believes in eliminating the seasonal idea in his branch of construction. He has accomplished this in several ways. One is by maintaining a mill on the company premises and lining up for the winter months small interior repair jobs throughout the surrounding territory. His men are all skilled mechanics so that he can send any one or two of them on any one of these jobs. The mill will turn out the materials necessary, and the men will do the work.

In addition to keeping his men on the payroll during the winter, Mr. Goble has in the last year or two arranged a series of evening meetings which are attended by the entire organization, and at which various construction problems are presented and discussed by men of the first rank. Last Fall the men of the organization got together and gave a company dinner which was attended by 145 men.

The class of work done by the Goble company demands a measure of skill that explains why such care has been taken in building up and holding together the present organization. In the construction of residences such as those shown on the accompanying pages there is little work for machines to do. Good materials handled by efficient men under careful supervision are necessary. The names of some of the architects for whom the Goble organization has built houses gives a good idea of the class of work done. The late Don Barber designed several houses built by Mr. Goble, and at present he is putting up houses designed by such men as Grosvenor Atterbury and Theodore Richards. Aymer Embury, Lewis Bowman and Frank Eaton Newman are others for whom he has done work. And most of them have come back for more.

The work is in general charge of Mr. Goble and Robert R. Powell, General Superintendent.

Another Goble-built residence—at Purchase, N. Y.

The office at White Plains, which is an unusual building put up especially to house the Goble organization, is in charge of Thomas H. Cole, Treasurer of the company. Charles F. Sanford is Vice-President and Mortimer Y. Pietschker is Secretary. Some of the men have been with Mr. Goble for many years and are loyal members of the organization. Four of the men have been on the job for more than 20 years; 4 between 15 and 20 years; 16 between 10 and 15 years, and 19 from 5 to 10 years. Those records tell the story.

A Few Extra Piles

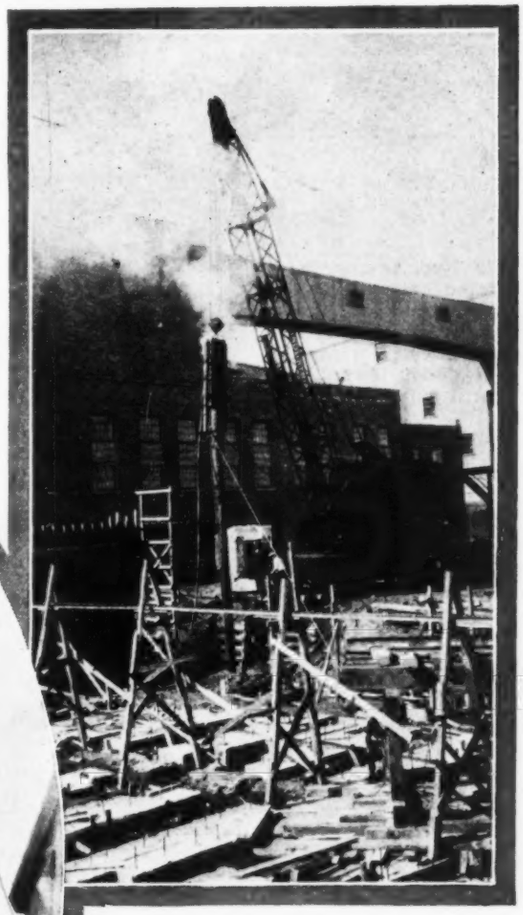
AFTER the pile driver had been moved away, the engineer in charge of the construction of an extension to a paper mill owned by Price Bros. & Co. Ltd., of Riverbend, Quebec, decided that it would be advisable to drive some additional 50-ft. piles. In order to avoid moving the pile driver back 700 ft., it was decided to use the company's Industrial crane with a McKiernan-Terry hammer for the job.

A piece of steel pipe 3-ft. long and 18 in. in diameter was bolted to the inside of the jaws of the hammer to act as a guide for the pile. Additional strength was obtained by strapping two pieces of 4x8 fir to the channel guides on the hammer and then bolting these pieces in turn to the pipe.

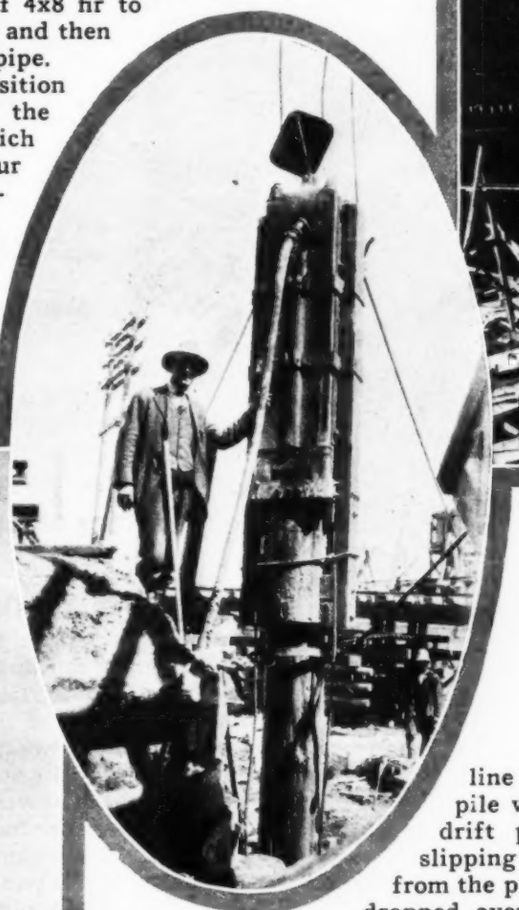
In order to hold the pile in position during the preliminary stages of the driving, an iron collar was made which fitted loosely around the pile. Four rope guys were attached to the collar, as was a sling to be used from the bucket line of the crane. The next step was to drive two drift pins about 12 ft. from the head of the pile. The steel collar rested on these pins. The crane then raised the pile by using the load line and moved it into position. The pile was plumbed by the guy lines, the drift pins preventing the collar from slipping down. The load line was detached from the pile, and the hammer was lifted and dropped over the pile, but not resting on it. The crane bucket line which was attached to the sling on the iron collar was next tightened and held in that position and the hammer was started, the load line being allowed to run free, but always under immediate control. When the pile had been driven until the hammer reached the collar, the hammer was stopped, and the bucket line was slackened and dropped down until the collar rested on the drift pins. Then the guys were tightened, the strain taken on the bucket line and the hammer started again. After the pile had been driven about 30 ft. the guys were dropped. The piles were driven to about 48 ft. and cut off.

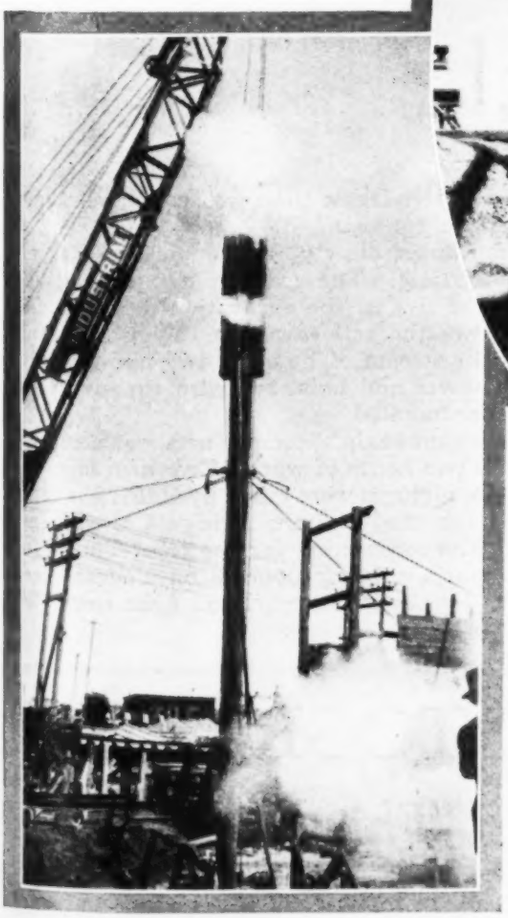
D. J. Emrey, construction superintendent for Price Brothers & Co., Ltd., and C. H. Jackson, his assistant, devised this method of handling the work.

At right—pile driven until hammer has just reached collar



Below—D. J. Emrey standing by the hammer





At left—The collar with its four guys is holding the pile in position during the early stages of driving

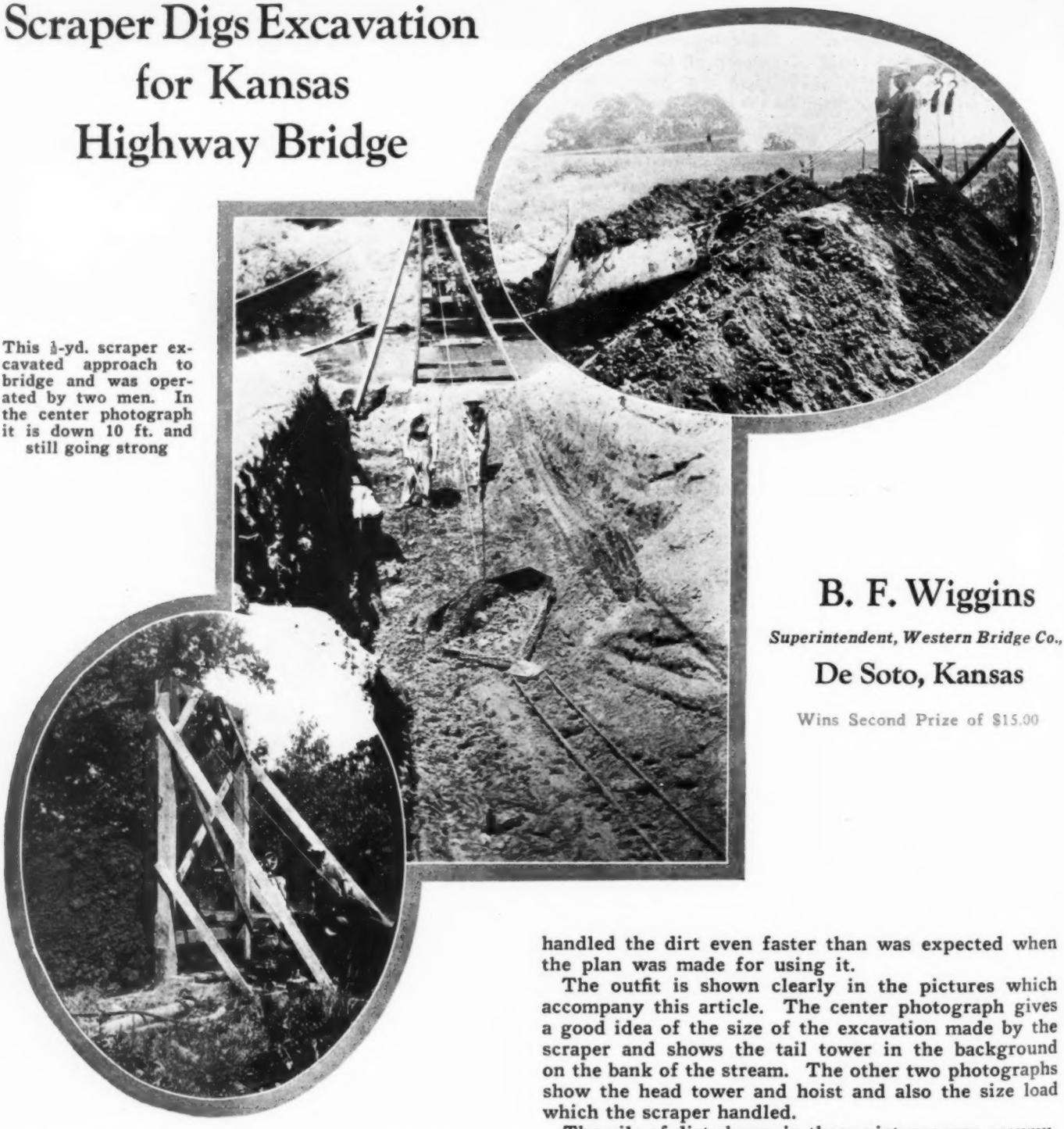
D. J. Emrey

Construction Superintendent, Price Bros. & Co., Ltd.,

Riverbend, Quebec

Wins First Prize of $25.00

Scraper Digs Excavation for Kansas Highway Bridge



This ½-yd. scraper excavated approach to bridge and was operated by two men. In the center photograph it is down 10 ft. and still going strong

B. F. Wiggins

Superintendent, Western Bridge Co.,

De Soto, Kansas

Wins Second Prize of $15.00

IN MAKING the excavation for a small bridge on a Kansas highway the superintendent and engineer in charge decided to try out a La Clair-Sauerman scraper operated by a small gasoline hoist. The outfit was set up on the bank of the stream and a ½-yd. scraper was used operating between two towers. This worked equally well in wet or dry material and handled the dirt even faster than was expected when the plan was made for using it.

The outfit is shown clearly in the pictures which accompany this article. The center photograph gives a good idea of the size of the excavation made by the scraper and shows the tail tower in the background on the bank of the stream. The other two photographs show the head tower and hoist and also the size load which the scraper handled.

The pile of dirt shown in these pictures was accumulated after about two hours of work. Two men handled the outfit. These pictures were taken by B. F. Wiggins, superintendent for the Western Bridge Co. of Harrisonville, Mo., the contractors for the job. The place on which the work is being done is on Federal Aid project 315 D, Johnson County, Kan., near the town of De Soto.

CASH PRIZES *for* PHOTOGRAPHS

First $25 Second $15 Third $10

See Conditions on Opposite Page

Big or Little

THE size of the job is not important so far as our monthly photograph contest is concerned. Two of the three prizes awarded in this issue went to little jobs.

IF YOU are proud of the work that you are doing, let others have a look at it. Dig out your camera, take a picture, and enter it in the September contest.

REMEMBER there are three prizes: First, $25.00; Second, $15.00; Third, $10.00. Win one and prove that there is money in the construction business after all.

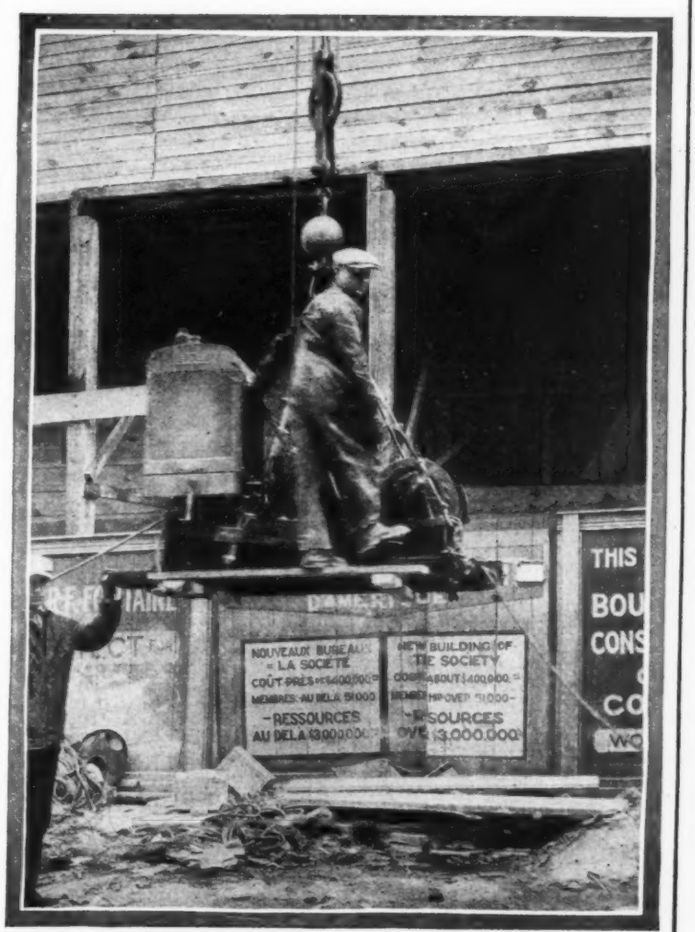
THE conditions are stated herewith: Photographs must be taken by a man actually employed on the job and should be sent to *Construction Methods*, Tenth Avenue at Thirty-sixth Street, New York City, by Wednesday, August 10, and plainly marked Photographic Contest. Photographs received after that date will be entered in the October contest. *Construction Methods* will pay for all non-prize-winning photographs which it uses.

J. Armand Brien

Superintendent, Bouvier-Brien Construction Co.,

Woonsocket, Rhode Island

Wins Third Prize of $10.00



His prize-winning picture shows Eddy Menard, the engineer, motoring down from a boom 90 ft. above the ground on the top of the new St. Jean-Baptiste building, Woonsocket, R. I. This building, which is a $300,000 fireproof structure, was completed in six months by the Bouvier-Brien Construction Co.

Test for Calcium Chloride

Quick Curing Obtained on New York Highway Job

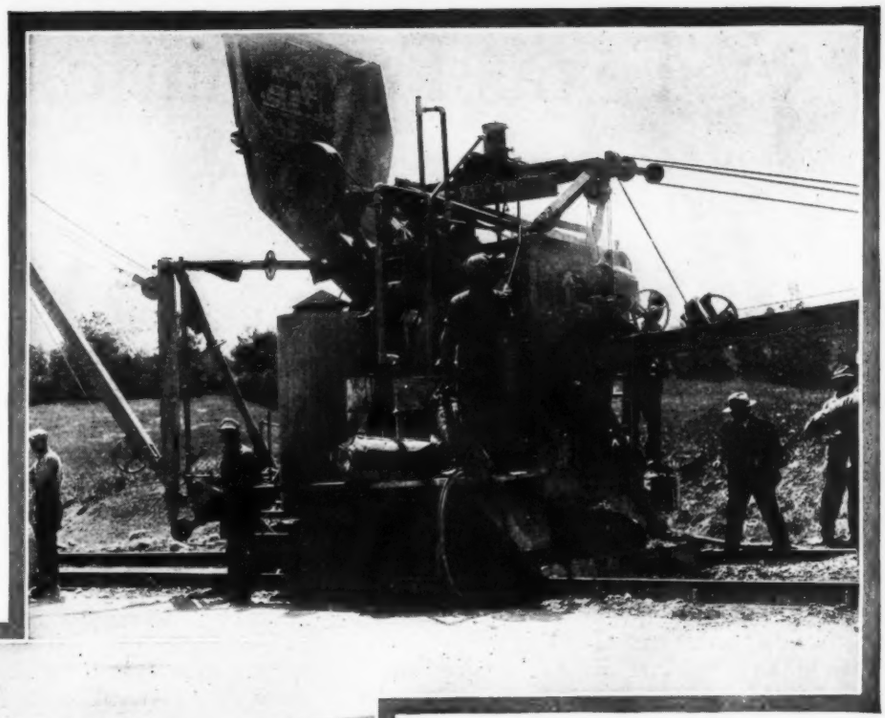
The speed with which the concrete hardened is well illustrated by the fact that the men are spreading burlap only a few feet beyond the paver

THE use of calcium chloride in speeding up the curing of concrete pavement is undergoing a thorough test at present on one of New York's main highways. A section about 2½ miles long between Chittenango and Syracuse is being paved to a width of 27 ft. The pavement is being put down in three strips, and calcium chloride is mixed with each batch, a Rex mixer being equipped with a pumping and measuring apparatus which makes certain that the proper amount of calcium chloride will always be used.

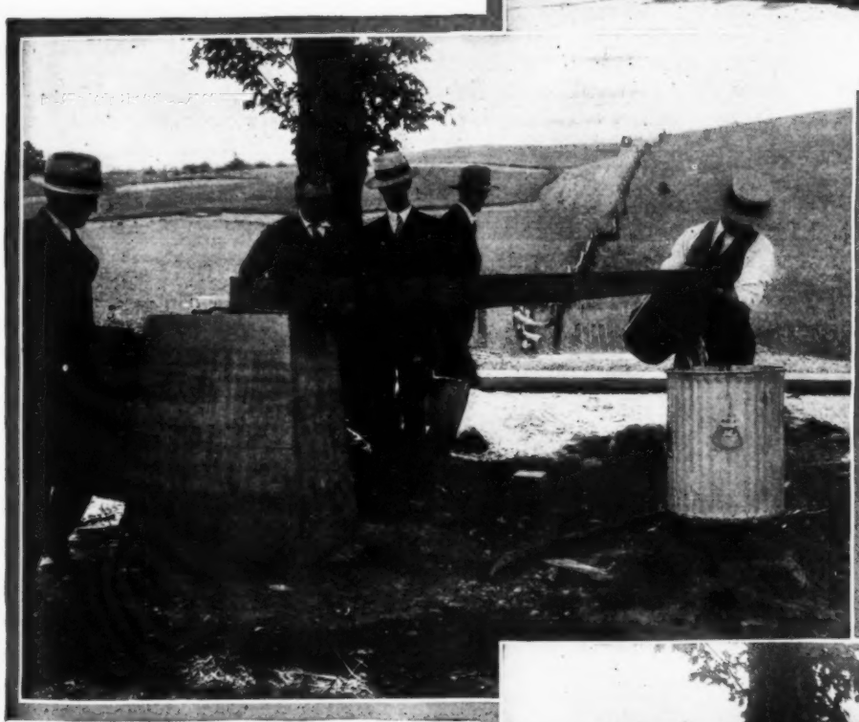
The contractors for this job are Bolton, Suits & Bolton of Watkins Glen, N. Y. They began paving about June 18th and worked at the rate of about 500 ft. a day. On the first strip, it was possible to open the concrete to the contractors' trucks and to traffic in two weeks' time, and, but for unforseen delays, it would have been open in 10 days. A much better record was made on the second strip. Pouring began on July 2nd, and the concrete was ready for traffic 5 days after it was poured. The contractor figures that by using the finished concrete to haul his materials over he is saving two batch trucks.

Calcium chloride is used at present in a great many states, sometimes only for surface treatment, but in other cases as an integral part of the batch as on this job. The calcium chloride on this job was furnished by the Solvay Sales Corporation. It is being used at the rate of 10 lbs. to every five bags of cement.

An Erie crane loads aggregates into bins. The cement house is at the left and the batch trucks pick up the cement as they go by



The Rex paver equipped with apparatus for mixing calcium chloride with each batch. The solution is mixed in tanks on platform of machine and pumped to measuring tank on top of mixer. A three-way valve operated by the action of the skip bypasses excess solution back into tanks



Two pounds of calcium chloride are used to each bag of cement. The strength of concrete is being tested by the cantilever transverse test developed by the Illinois State Highway Department. The testing machine consists of an extension arm which is fastened to the free end of a specimen beam which is held in cantilever. The load is applied by pouring water into the can suspended from the end of the beam. A test block from the Bolton, Suits & Bolton job is shown undergoing the test

A test which showed good early strength in the concrete as the breakdown did not occur until the can was nearly full of water. The concrete on this job has shown an average seven-day strength of 450 lb. to the square inch. In one case a test block stood up for four minutes under a load of 547 lb. to the square inch, the extreme load possible with the particular container used

A Texas Foundation Problem

Warehouse on Bank of Ship Channel at Houston Built on Concrete Mat

THE situation of a large warehouse, recently completed at Houston, Tex., necessitated extremely careful planning for the foundation. The site selected for the structure, which is about 250 ft. square and owned by the Houston Terminal Warehouse & Cold Storage Co., is on the bank of the upper ship channel which in the near future is to be dredged to a depth of 12 ft. It was largely because of the proximity of the building to this channel that the extremely careful study of the foundation problem was made.

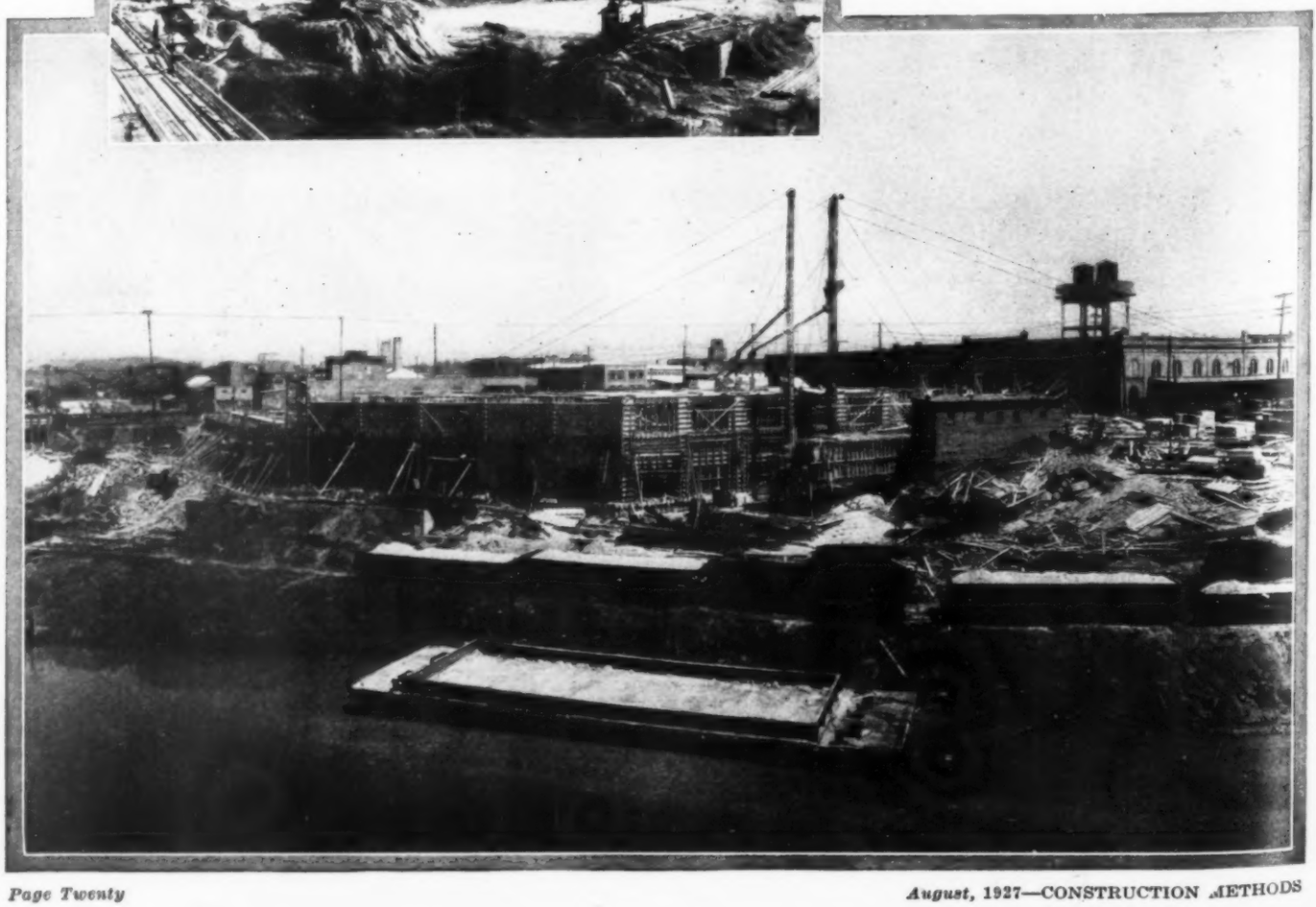
Piling with isolated footings was first considered, and it was found that piles at least 45 ft. in length would be required and that the cost would be more than $250,000. It was then decided to design a continuous slab footing covering the entire area of the building. As two layers of quicksand were found, Lackawanna steel sheet piling was driven along 600 ft. of the edge of the mat on the side next to the channel. This piling was anchored to the slab at the top with 1¼-in. bolts. The piling was driven before the slab was poured, and the slab was then poured up against it.

A mat 26 in. thick was poured over the entire area, about 700 tons of reinforcing steel being used. This mat ultimately will carry an 8-story building with column spacing of 21-ft. centers. The column pedestals were placed on top of this mat. The elevation of the basement floor is 4 ft. above the top of the mat and sand fill is used in between. It was necessary to go to this depth in order to get the proper bearing soil.

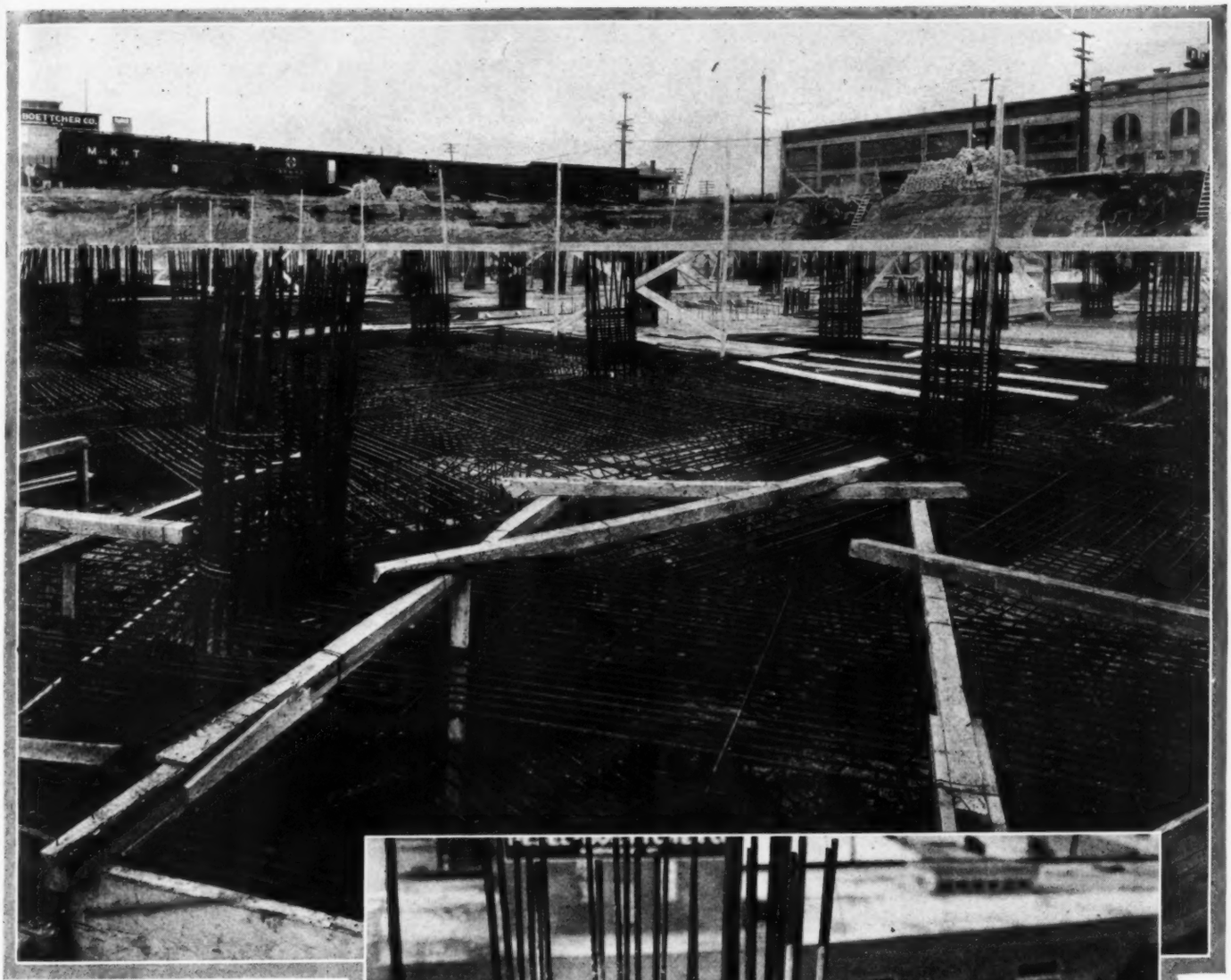
In constructing the mat a concrete retaining wall was placed around three sides of the building extending below the bottom of the mat. A bank of dirt was left around the inside of the wall with a 2 to 1 slope to protect it while the excavation was going on. After the slab was poured to the bottom of this slope braces were placed from the slab to the wall, the dirt embankment was then removed, and the slab extended to meet the bottom of the retaining wall.

An unusual feature of the work was the pouring of a 2-in. layer of rough concrete over the entire area after the excavation was finished. This was done in order to facilitate the placing of reinforcing steel. It proved even more successful than was expected, because some extremely wet weather was encountered and during this time the men were able to place the steel on a clean substantial floor, which ordinarily would not have been the case. The column centers were perma-

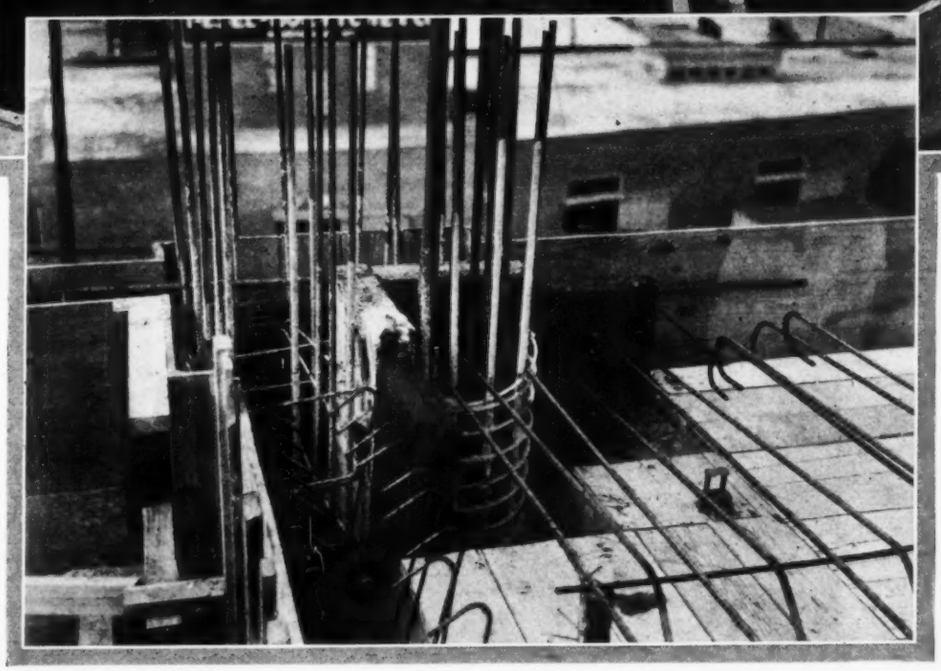
At left—The excavation after 2-in. layer of concrete had been poured



Below — General view of warehouse under construction with ship channel in foreground



Reinforcing steel for the concrete mat. The mixers which poured the mat are set in the bank at the right



Split column construction showing placing of cork insulation

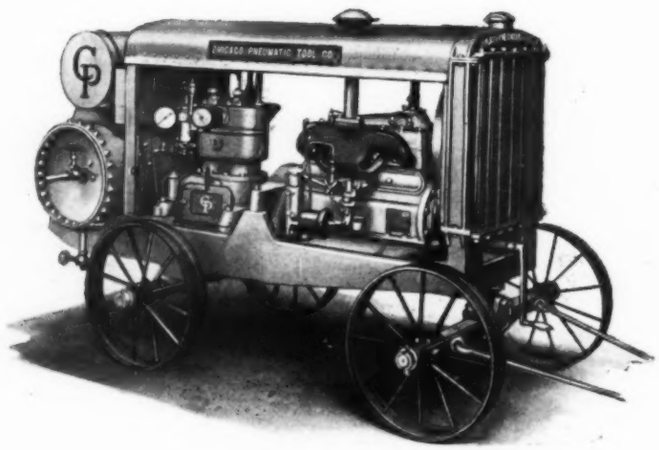
nently established in this light layer of concrete and brought up from these points. Two small mixers, a Boss and a Jaeger, which may be seen in one of the photographs, were used.

For the construction of the floors and walls, Lakewood and Archer Iron Works towers and chutes were used. At present only six of the eight stories planned have been built.

In the cold storage section of the building, the structure has been designed with split columns, a 5-in. space being left all around the outside walls in order to place the envelope type of cork insulation. The columns carrying the floor loads are independent of the outside curtain wall construction and are tied together at the floor levels by 1-in. anchor bolts. The cork envelope will continue through the floor slab and immediately over the portion devoted to cold storage.

The job is being handled by the Hewitt Construction Co. of Houston. The engineering was done by the Engineering Service Corporation, also of Houston. The subcontractors for the excavation were Vilbig Bros. of Dallas. They did most of the work with a Bucyrus 1½-cu.yd. Diesel dragline and a Northwest 1-yd. gasoline dragline. William Moore of Houston drove the sheet piling with a McKiernan-Terry steam hammer.

PROPER EQUIPMENT



Boyer
Riveting Hammer

CP Air Compressor, PG-DGL 100 cu. ft. capacity mounted on Ford Truck and BQ 46 Pavement Breakers being operated by a prominent Public Utility Company.

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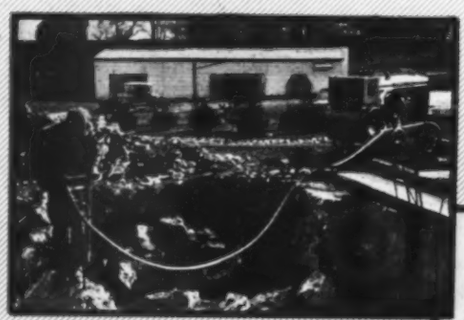
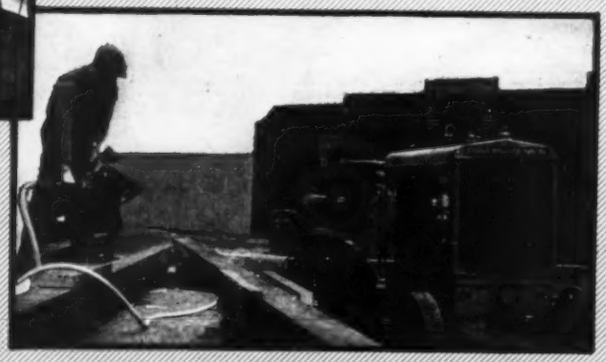


CP Portable Air Compressor and CP-10 Rock Drill excavating for sewer disposal basin.



CP Portable Air Compressor and No. 5 Little Giant Wood Boring Machine framing sewer timbers.

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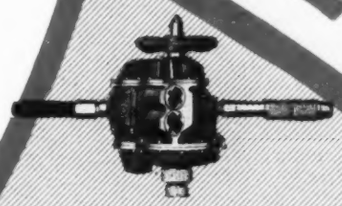
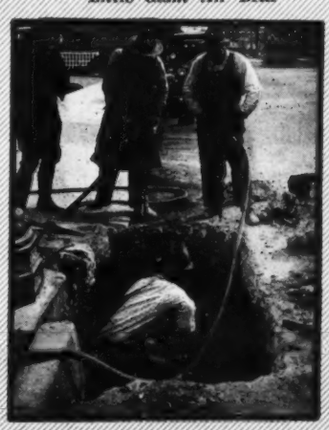


Little Giant Air Drill



CP 114 Demolition Tools operated by CP Portable Air Compressor, P6-DGL. 100 cu. ft. capacity, breaking up 10 inch concrete pavement.

CP Portable Air Compressor P6-DGL, 160 cu. ft. capacity and CP 114 Pavement Breakers on street railway repairs.

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- ☐ CP Sinker Drills.
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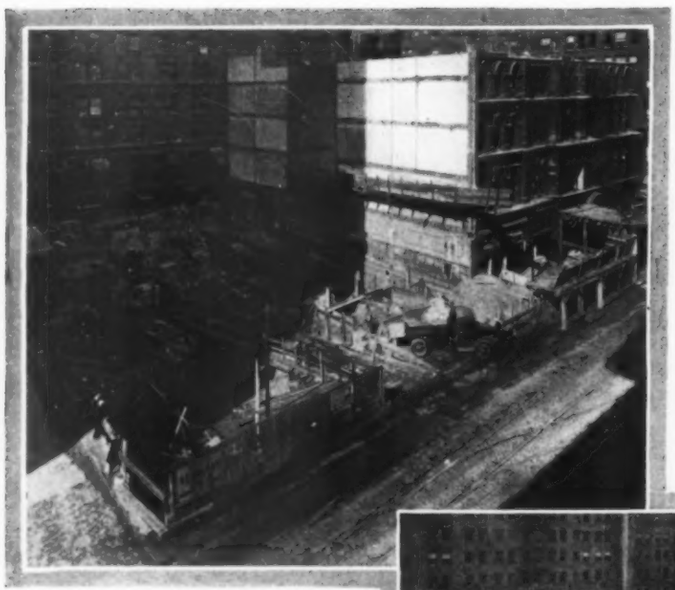
From Cellar to Garret

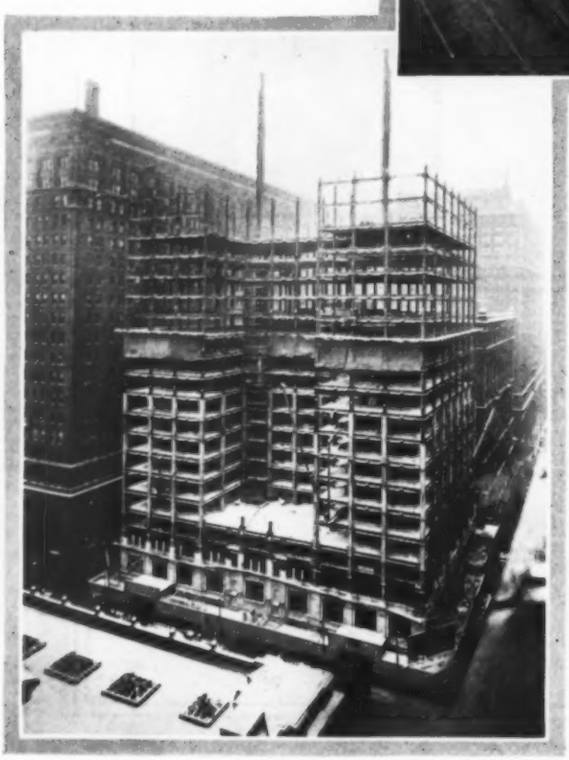


The Start
Part of the site cleared and the remaining old buildings being wrecked

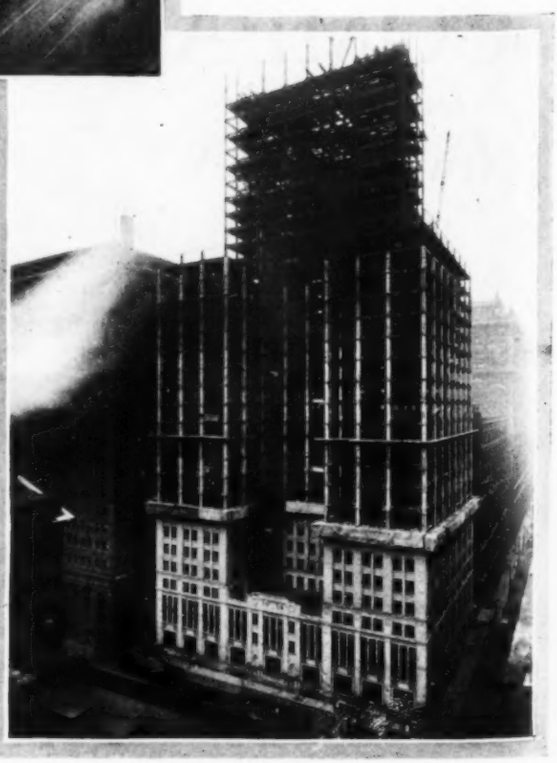
One Month
Site entirely cleared and first derrick on the job

Three Months
Steel still rising and stone being set on lower part of structure

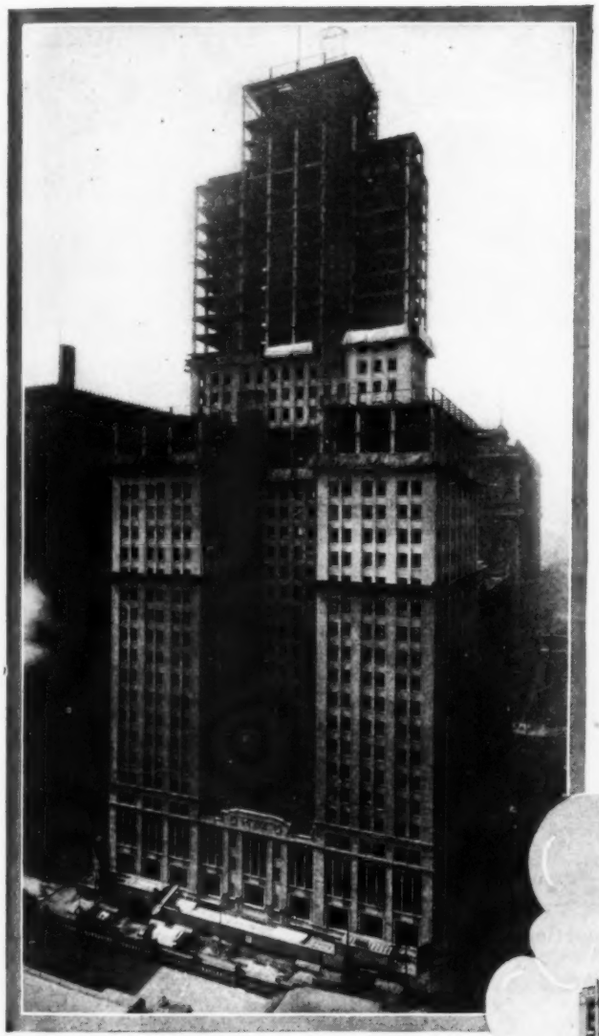
Four Months
The tower section under way. Terra cotta facing begins at fourth floor



Two Months
Steel up on first five stories



t in Seven Short Months



Five Months
Steel reaches full height of structure

Six Months
Facing near the top

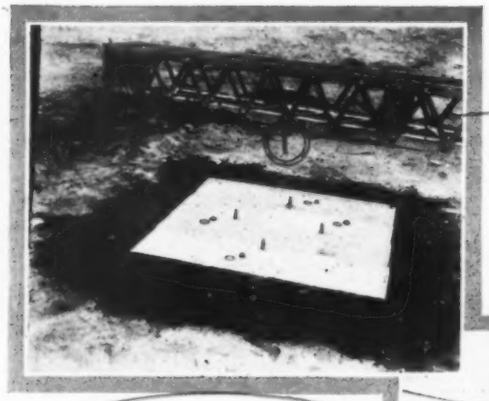
Seven Months
Ready for the tenants

The new Bankers' Building in Chicago, which is 41 stories in height, was recently completed by the Dilks Construction Co., formerly the Starrett-Dilks Co., of which Lorenzo C. Dilks is President. This series of photographs shows the speed with which the big structure went up. A carefully planned schedule was followed and the work went forward smoothly and without interruption

The architects of the new Bankers' Building were D. H. Burnham & Co., and it was constructed for the Adams-Clark Building Corp., headed by Ernest A. Jackson. The structure has a frontage of 178 ft. on Clark Street and 175 ft. on Adams Street. It is 476 ft. high. The lower floors are faced with Benedict stone and above that height, terra cotta and brick are used

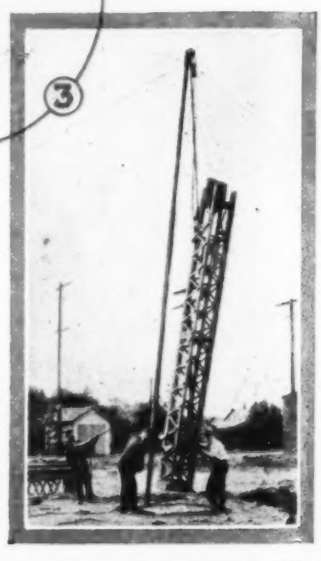
Step-by-Step Field Methods—

Follow the Red Line



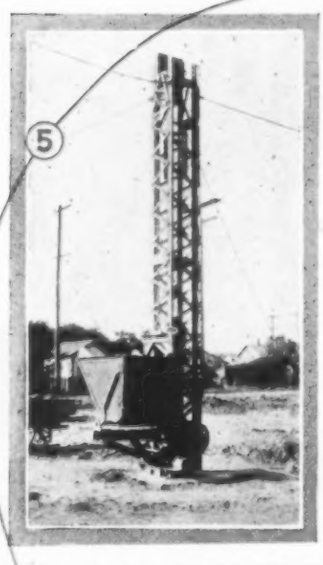
1. Concrete foundation with anchor bolts in place

2. Reeving blocks for erection of gin pole



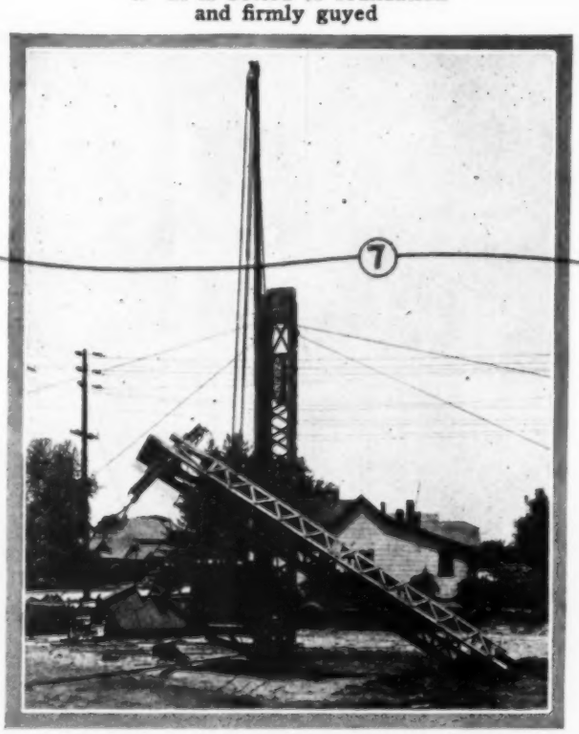
3. First section of mast is taken up and set

4. It is bolted to foundation and firmly guyed

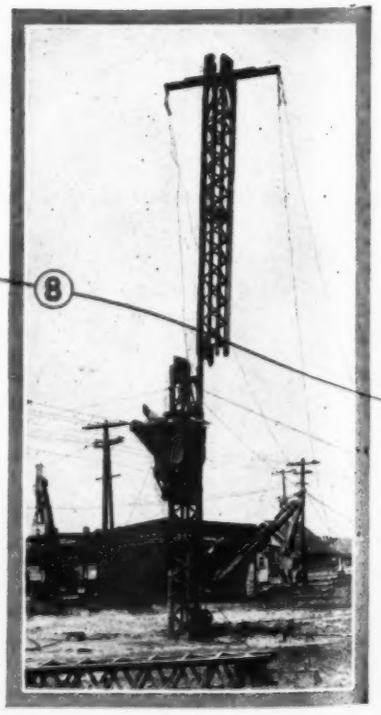


5. Top and bottom sheaves and concrete bucket come next

6. Gin pole is stepped on bucket frame

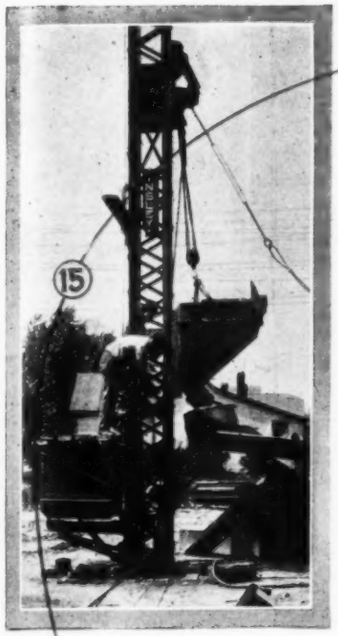


7. Picking up second section with block and fall on gin pole. Guy connection beam at top of second section

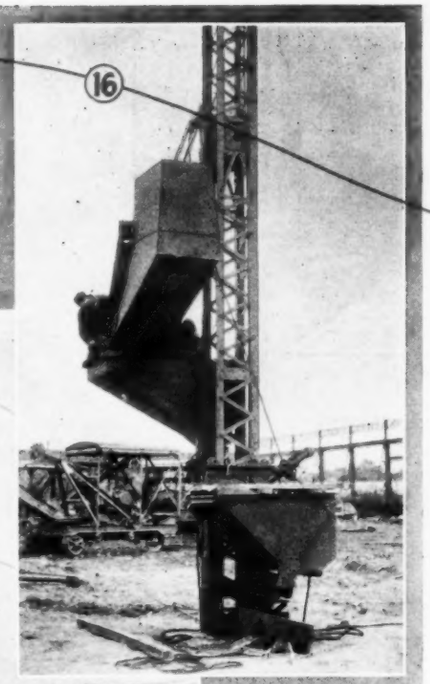


8. Bucket, gin pole and second section go up together

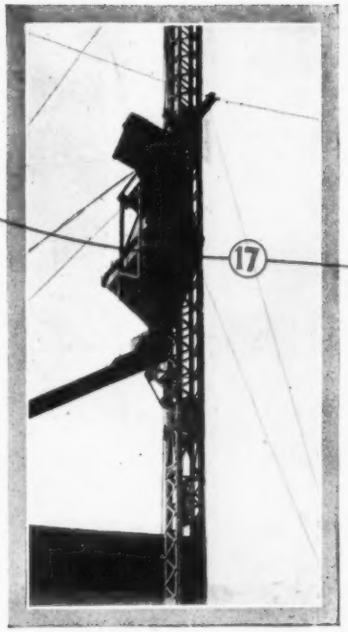
SETTING UP A MAST HOIST



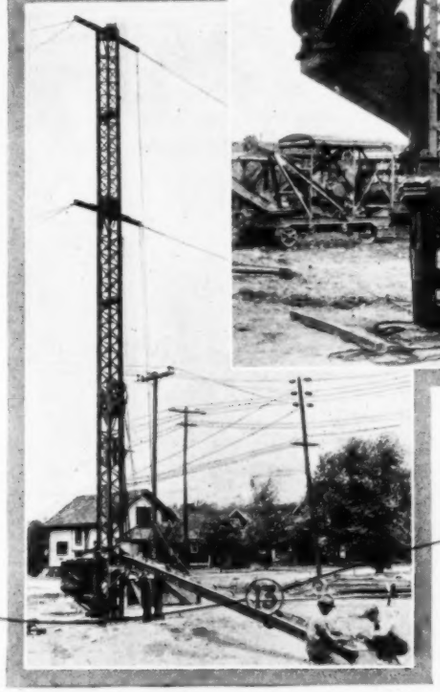
15. Placing hopper



16. Placing dumping switch and chute



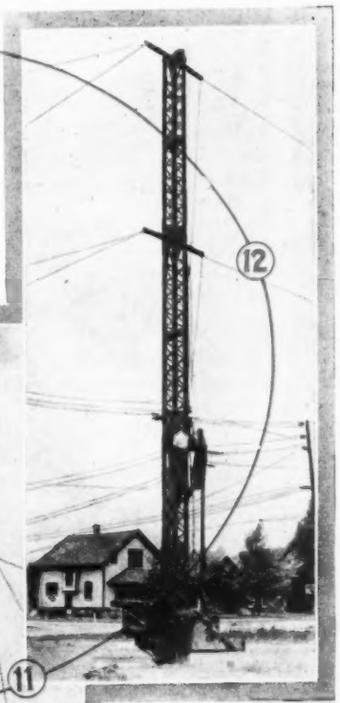
17. Raising sliding frame, hopper, switch and chute



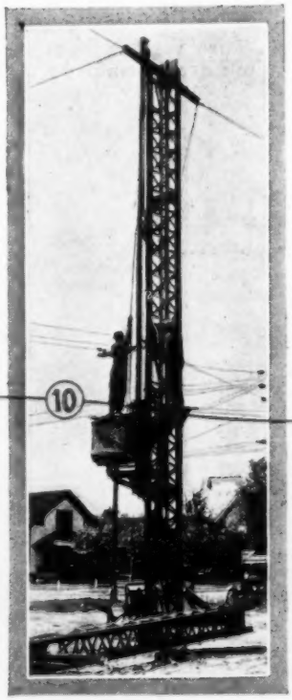
13. Connecting topping line to boom chute

Follow the Red Line

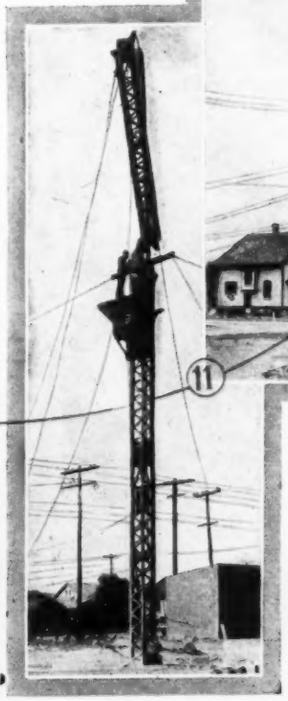
14. Boom seat bracket in place



12. Placing boom topping line bridle



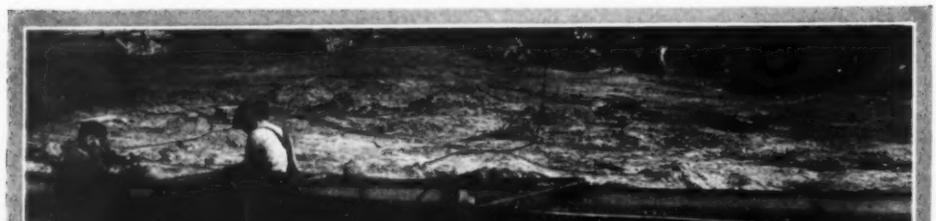
10. Top sheaves removed and raised to top of second section



11. Hoisting and placing the mast section

9. New mast section lowered into place and bolted

SETTING UP A MAST HOIST



18. Assembling counterweight chute

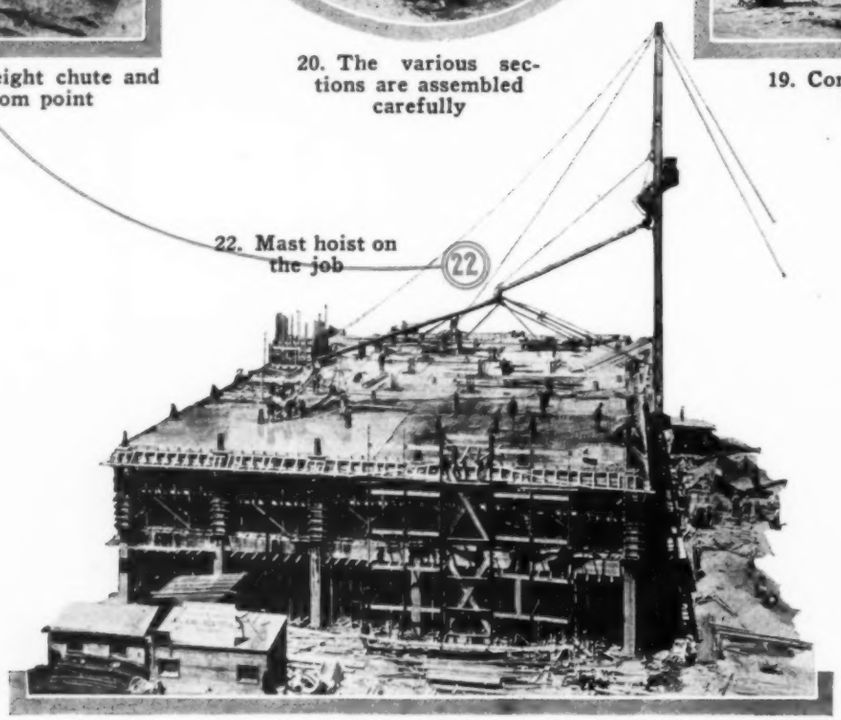
Follow the Red Line

21. Hoisting counterweight chute and connecting to boom point

20. The various sections are assembled carefully

19. Connecting boom and boom chute

22. Mast hoist on the job



These pictures show the various steps in the erection of an Insley mast hoist

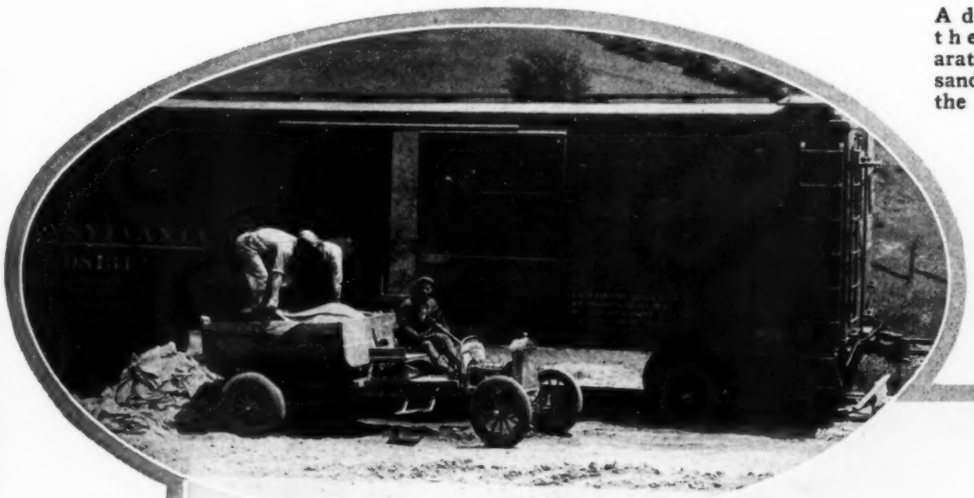
Getting Aggregates on the Job

Conveyor and Loader Handle Slag and Sand for Ohio Road

AN UNUSUAL method of unloading aggregates for a concrete road job was used by the Holmes Construction Co. of Worcester, Ohio, on a 3-mile contract near New Philadelphia. The aggregates were brought to the material yard in railroad cars, and a Barber-Greene portable conveyor was used to unload them. The conveyor took the materials from under the cars and deposited them in a two-compartment bin, one for slag, and the other for sand. In addition, it built up ground storage piles on each side of the bin so that there always was a sufficient supply of aggregates on hand.

A Barber-Greene bucket loader also operated on the job. While the conveyor was unloading slag at the bin, the loader would spend its time batching sand, and while the conveyor was unloading sand, the loader would move over to the slag pile. The only change necessary was to set the bottom of the strike-off hopper once each time a change was made. With this outfit, it was possible to unload four cars of slag and three cars of sand in an average day.

Cement was brought to the job in box cars and kept separate from the sand and stone on the batch trucks on the way to the mixer by an ingenious double canvas flap fastened to the driver end of the dump body. After the sand and slag were in the truck, one flap was thrown back over the aggregates and the cement bags emptied on it. The second flap was then used to cover the loose cement on its way to the mixer. This arrangement prevented wastage of the cement between yard and job.



A double flap kept the cement separate from the sand and slag on the way to the mixer

The portable conveyor unloaded sand and slag. It kept the bin full and maintained two storage piles

Raising Railroad Tracks Above

Gang raising section of track

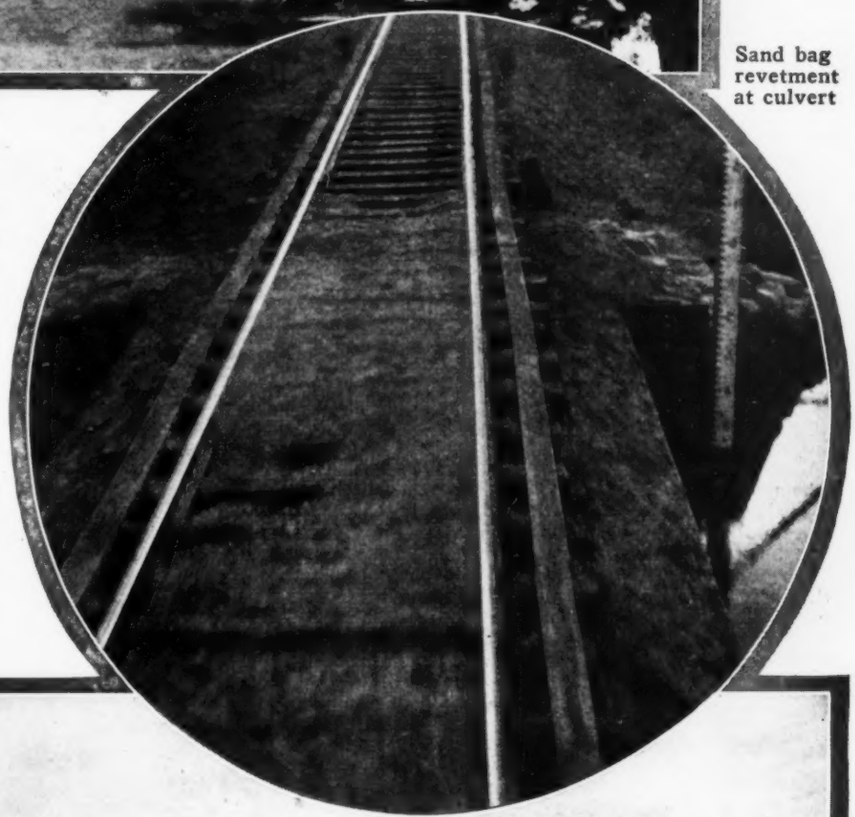
Work train at west end of raised section

Raised track partly ballasted

The raised track was anchored to short posts by wire. A typical flood section

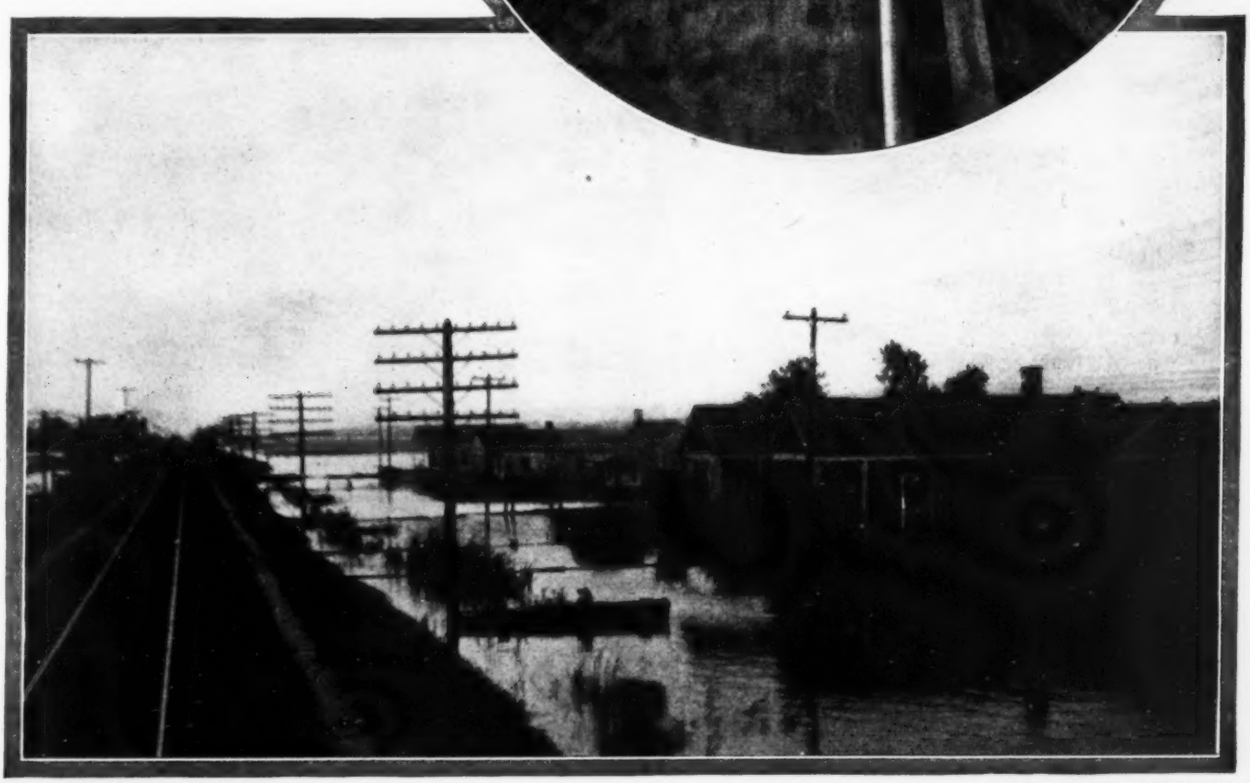
Flood Levels in Louisiana

A refugee camp



Sand bag revetment at culvert

KEEPING the lines of communication open in the flooded districts of the Mississippi Valley required quick thinking and quick work. One of the few railroad lines in Louisiana which kept its tracks open was the Texas-New Orleans Railroad over which the Southern Pacific trains run. On a section just west of Morgan City, the track was raised 15 to 22 in. by laying stringers on the old ties and new ties on the tops of the stringers. The raised track was anchored to posts with wires and was ballasted as fast as it was laid. All New Orleans western freight was shipped over this track for a considerable period of time.



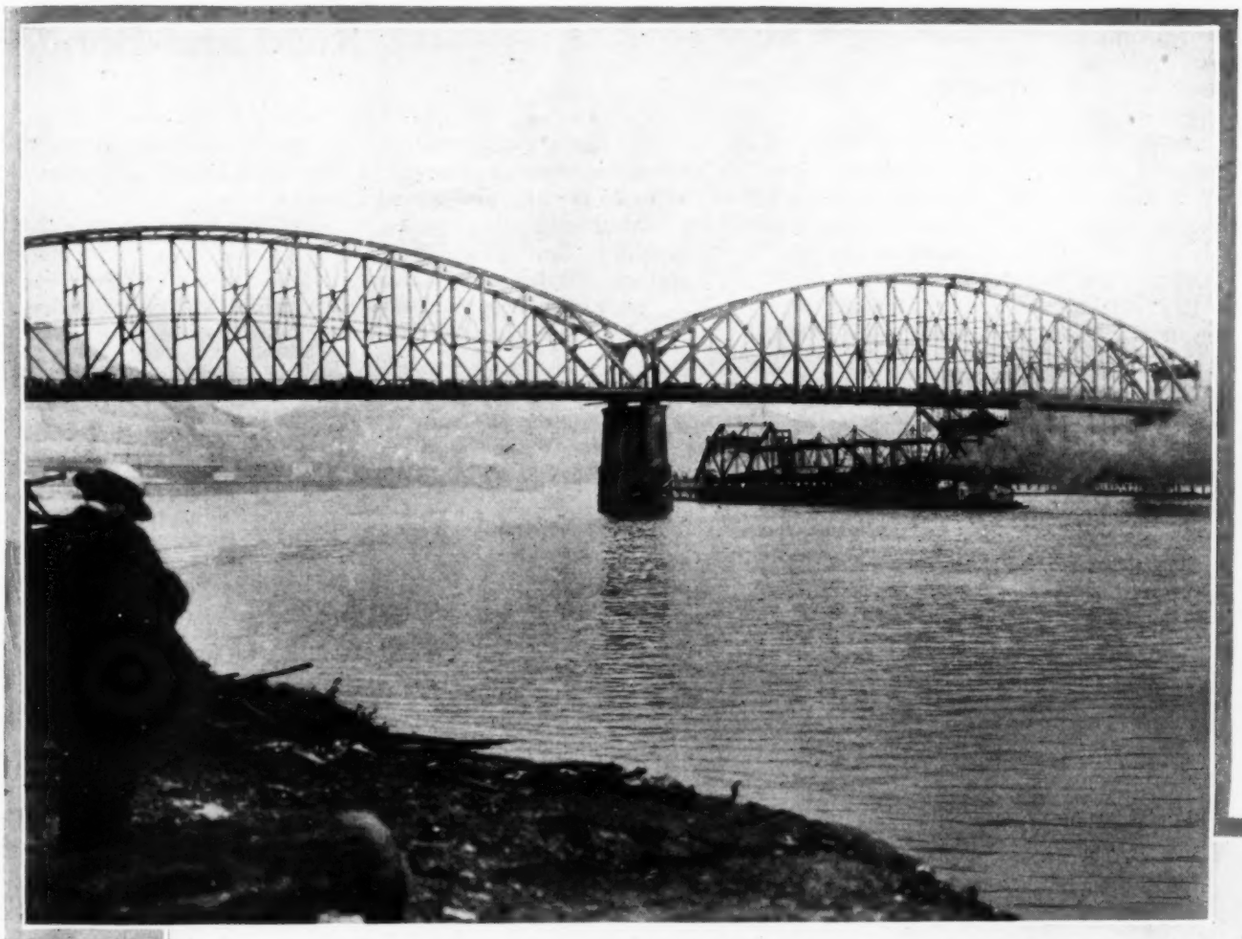
Morgan City, La., under water

Old Sixth Street Bridge at

The moving of the Sixth Street Bridge, which for many years has spanned the Allegheny River, to Coraopolis, about 10 miles down the Ohio River, has been attracting attention in the construction field. Last month one of the prize pictures showed this bridge in process of demolition and these two pages show other phases of the big job. The picture above is a general view of the bridge after the approaches had been removed and the other two photographs on this page show details of the operation

The work is being done by the Foundation Company of New York. It was found necessary to remove the top chords of the spans in order to get them under the Manchester Bridge. The photograph at the top of page 33 shows one of the spans passing under the bridge and the picture at the bottom shows the same span going through the lock at the Emsworth Dam

Pittsburgh Floated Down Ohio



Caliche Simplifies Surfacing

Rock Containing Own Road and Bonded

IN CERTAIN sections of the country nature has been kind to the road builders. The State of New Mexico is the recipient of this sort of kindness on a 14-mile job on the Lee Highway about 25 miles east of Roswell. The Mulligan Construction Co. of El Paso, Tex., headed by John Mulligan, is doing the work.

The new road, which is 18 ft. wide with a 20-ft. crown, is being surfaced with an 8-in. course of caliche, a peculiar type of gypsum or limestone which occurs in that section. This rock, which is young geologically, contains its own binder, thus making it extremely adaptable to highway surfacing. It is found at the surface of the ground, and the cap rock, 4 or 5 ft. in thickness, is hard. This hard material passes the Government coefficient of wear tests. The softer rock is used for binder. In screening the caliche, 100 per cent of the material must pass a 1-in. round screen and about 65 per cent of it passes a ¼-in. round screen. This finer material constitutes the binder.

The subgrade is prepared with mules and fresnos, and the caliche is then spread in one course, later being bonded by traffic. It takes a hard, firm surface in about 60 days. As the road on which the Mulligan organization is working has a daily traffic of 1,000 cars in the tourist season, the job of

Plowing the subgrade with the aid of a quartet of mules

One of the rock pits where the caliche is obtained. Fresnos are used for taking it to the crusher

# of New Mexico Highway

Binder Is Spread on by Traffic

getting it into finished condition is soon accomplished. To those who use the road this method is far more satisfactory than that necessary with some other types. Any road which can be opened as soon as the construction gang departs is sure to be popular with the traveling public.

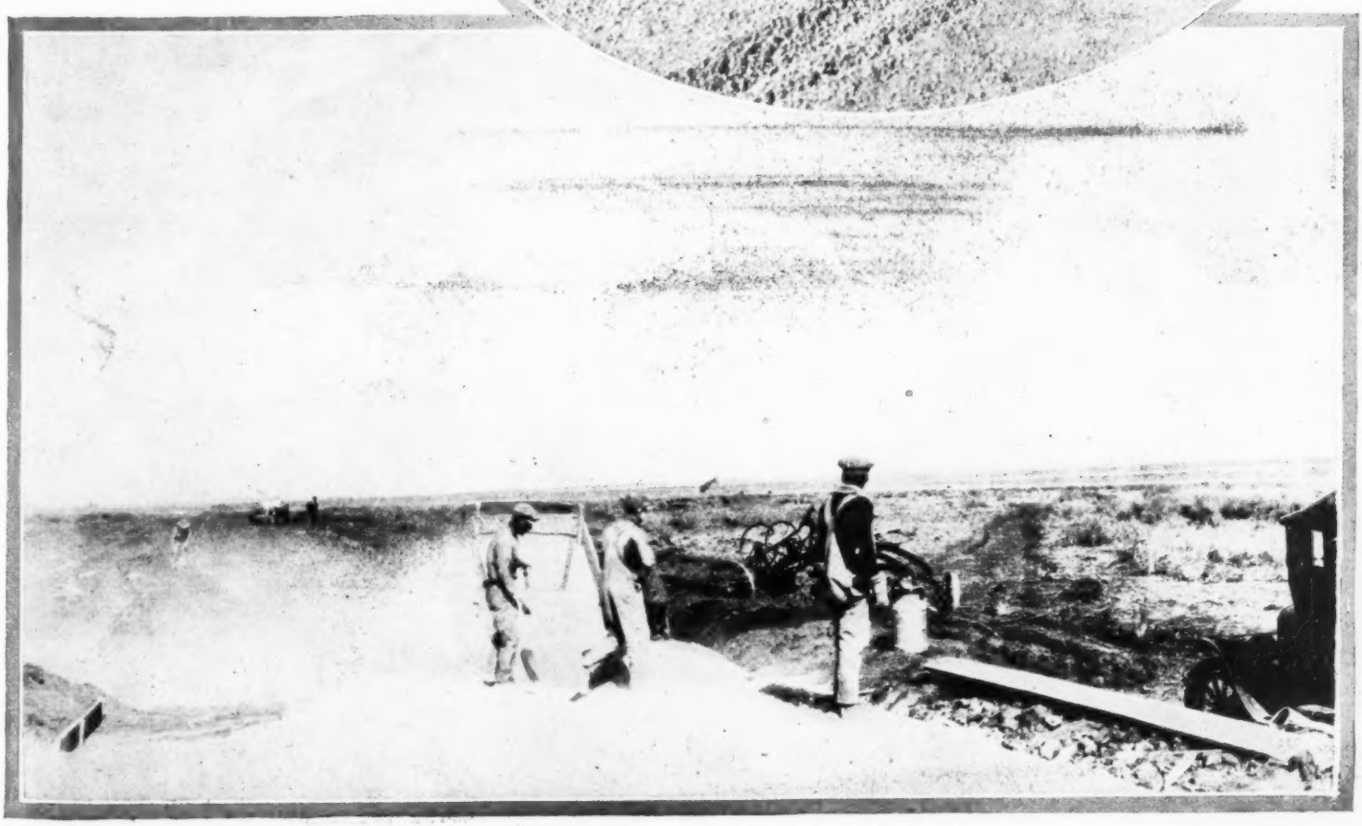
For crushing the caliche two Cedar Rapids crushing and screening plants are operated, each having a capacity of about 300 cu.yd. in 9 hr. Nine small trucks are used for transporting the caliche from the crushers to the road. Two Russell graders and a Caterpillar tractor also are on the job.

Work was begun last November and will be finished about September 1st. About 30 men are on the job under the direction of C. R. Gardner, the superintendent. This project, which is a Federal Aid project, is in Dist. No. 3, of which B. F. Kelly of Roswell is district engineer. S. C. Roberts is the project engineer.

After sixty days under traffic the road surface becomes hard as concrete. It is durable and can be economically maintained. Caliche surfacing put on this same highway four years ago is still in excellent shape and has retained its original smooth condition more satisfactorily than do some ordinary macadam roads.

Spreading the caliche after it has been dumped on the subgrade. This gives a good idea of the character of the material

Dumping a load of caliche on the subgrade



Bins Equipped with Three-Way D

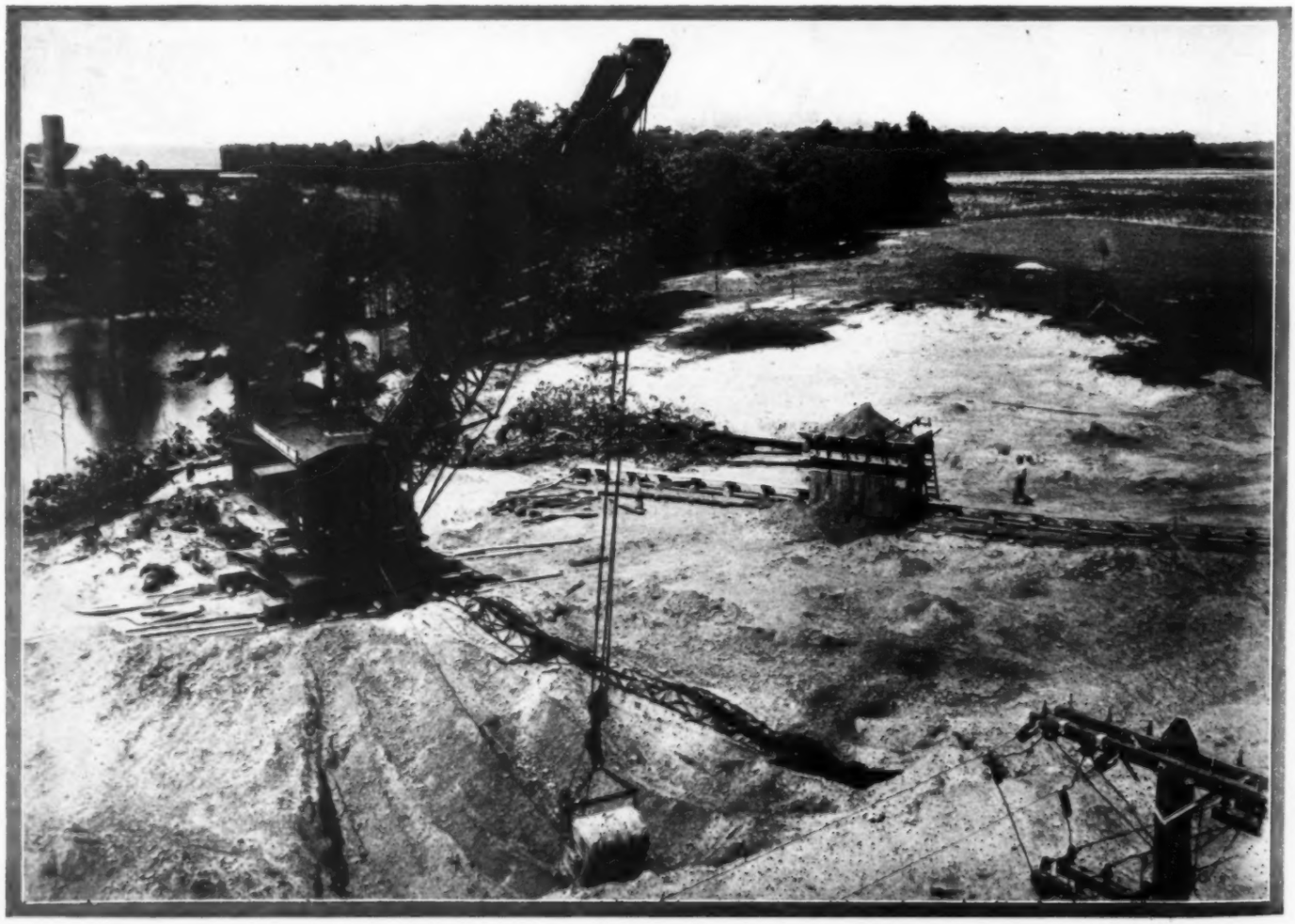
General view of plant showing conveyor system

THE plant of the Commonwealth Sand and Gravel Corporation just outside Richmond, Va., which has just been completed, embodies some excellent design features which should make its operation efficient and economical. The Commonwealth Corporation has taken over a property of over 100 acres covered with a gravel deposit from 25 to 40 ft. thick. The property abuts on the right-of-way of the Chesapeake and Ohio Railroad and a short spur track connects the plant with the main line. One of the notable features of the plant is the three-way arrangement of the discharge gates on the bins. Cars on two tracks and trucks can be loaded simultaneously. The plant can maintain a daily output of 1,000 tons.

The photographs show the layout of the plant, although at the time they were taken, work under the bins had not been completed. A track is to be laid along one side of the bins, and a concrete road for trucks is to be put down on the other side. The triple discharge system can be seen. Radial gates in the bottom of the bins are opened to load cars on the track beneath and spouts from the inclined sides of the bins can discharge into trucks or cars. The gates on the sides of the bins are not placed directly opposite each other, one being a little above the other.

The bins are of the standard Butler type, elevated on longer and heavier columns than usual in order to give 16 ft. of clearance between top of rail and bottom of radial gate. The side gates and spouts are a special feature provided to meet the requirements of this plant. There are

This Bucyrus steam dragline gets out the sand and gravel. Water from reservoir in left background is used for washing



y Discharge

three bins of 200-cu.yd. capacity each. Two of these are divided into two compartments. Three sizes of gravel and two grades of sand are thus provided for.

Material is excavated with a steam dragline, using a 2-cu.yd. bucket, and is taken to the screens above the bins by a conveyor system. Oversize gravel is chuted from the screens into a crusher. The plant equipment is operated by electric power and is controlled by one man on the platform above the bins.

The bins and superstructure for the plant were furnished by the Butler Bin Co., Waukesha, Wis. The screens, conveyors, and crusher are the Telsmith type, made by the Smith Engineering Works, Milwaukee, Wis.

L. G. Thom, vice-president and general manager of the Commonwealth Sand and Gravel Corp., is in charge. G. E. Jordan is his assistant.

The new bins with three-way discharge system. Trucks are loaded at one side and cars directly under bin and at other side

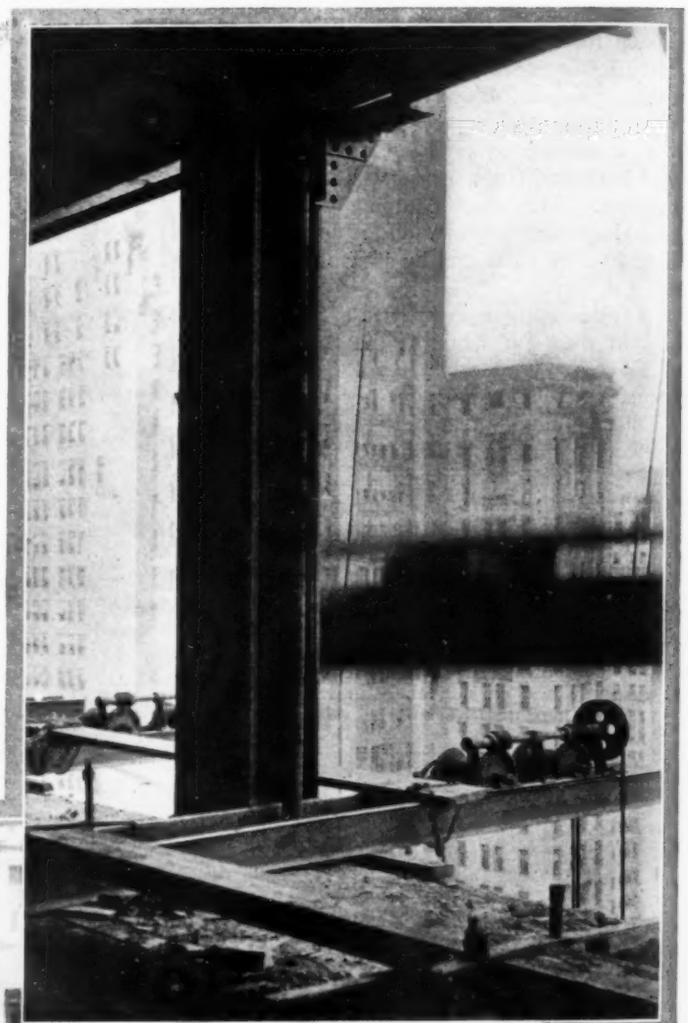
The Job Must Be Safe

Need for Protecting Workers Gaining Increased Recognition —New York's Efforts

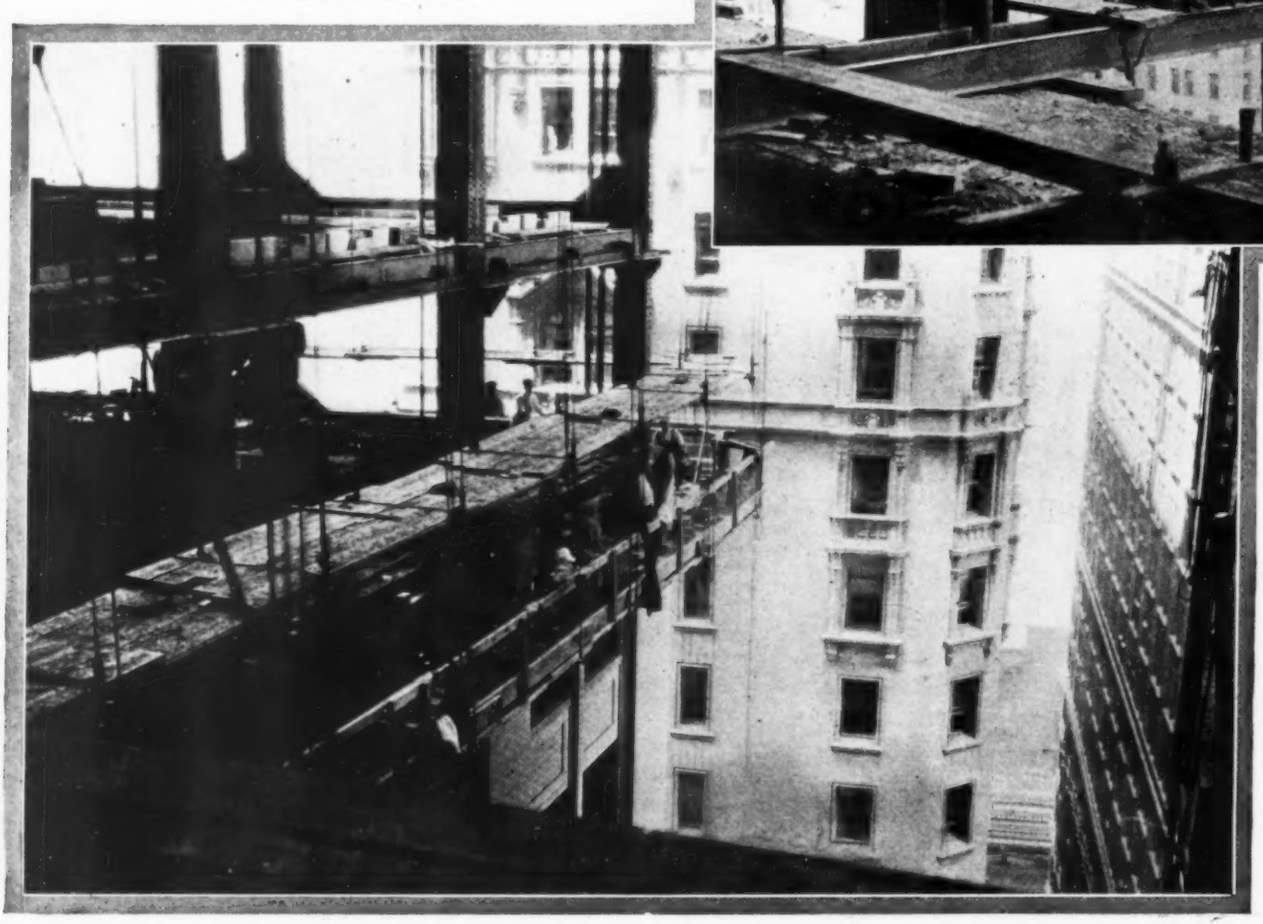
WHILE protecting the workman engaged in industrial occupations has long been the subject of regulation and legislation by state authorities, it is only within comparatively recent years that real attention has been given to the safety of the man working in the building or general construction trades. In fact, it is less than a year since the State of New York has provided anything like an adequate inspection force under the State Department of Labor to cover this particular field, and with the exception of New York, Massachusetts, Pennsylvania, and one or two of the Western states, it is still a matter which is neglected throughout the country.

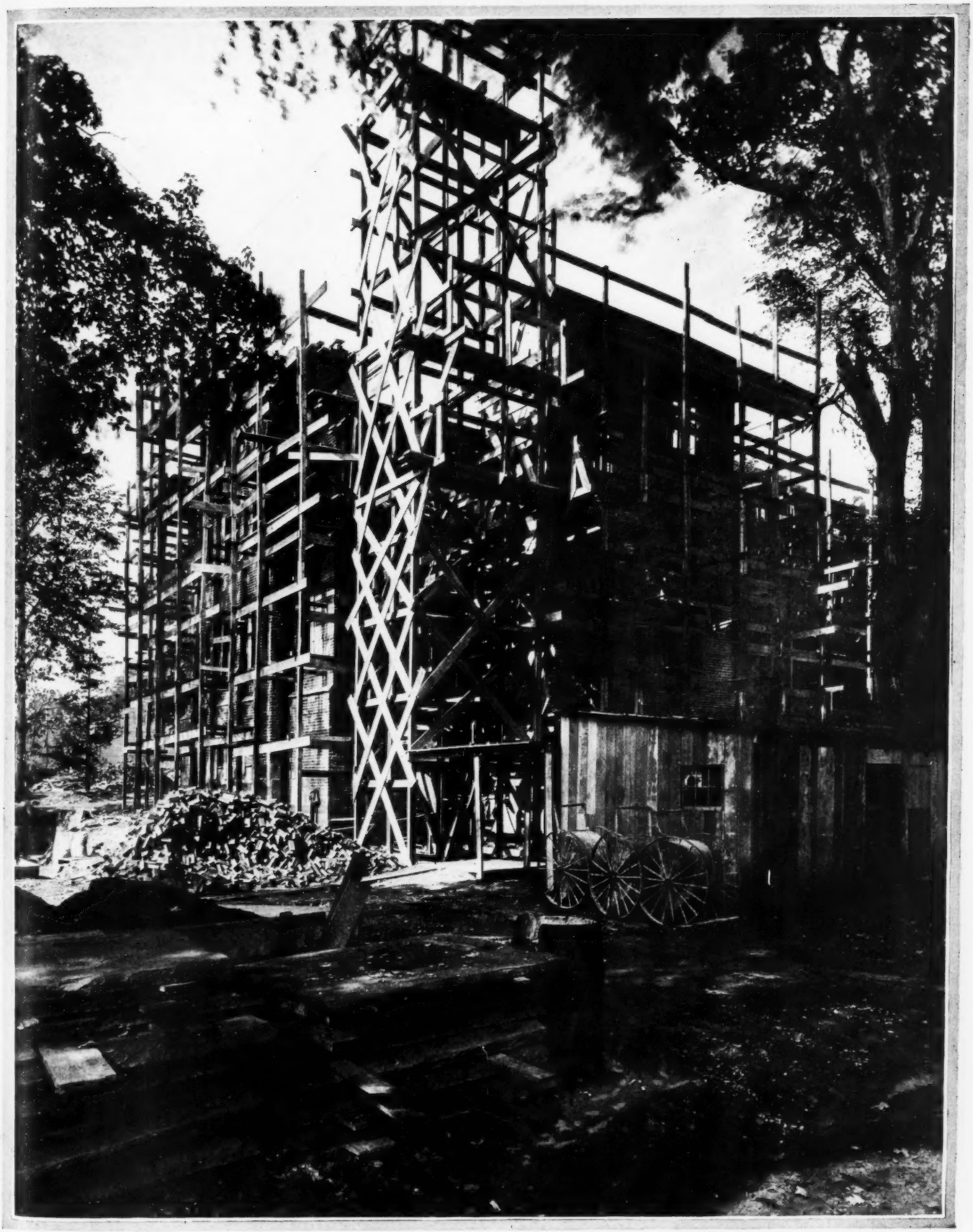
Proper scaffolding, the furnishing of thoroughly safe equipment in the form of ladders, derricks, hoists and the like, the protection of stairwells and floor openings, and the providing of adequate sanitary facilities are the factors which combine to make for safe conditions in the construction field in the light of the experience of the New York State Department of Labor.

Regulation of building construction by the Department



Outside swinging scaffolds of this type are approved as safe. They are used on most big jobs nowadays





A properly built scaffold and hoistway. Posts and uprights are 4x4's butted on ends with splice plates all properly bolted. The Lowman Construction Co. of Elmira handled this job

of Labor was first undertaken in a general way by New York in 1920, following the introduction of similar regulation in Massachusetts. The New York law was without teeth, however, in its early years and was hampered by the lack of an adequate inspection force. The number of inspectors even today is not nearly sufficient for the territory.

The larger force was established in July, 1926, and has made more than 12,000 inspections.

George W. McMein, under the supervision of James L. Gernon, Director of the Bureau of Inspection of the Department, has charge of the inspection of buildings in New York State. He has found virtually little or no difficulty is encountered in enforcing the spirit and letter of the law on jobs carried on by the larger construction companies.

"The scaffolding on the large jobs," said Mr. McMein in explaining the operation of his department, "is as safe as can be devised. This is especially true of the suspended scaffolds on which almost all of the construction work on outside walls is done these days. This scaffolding is supplied by companies which have that as their regular business. The outriggers are of steel and so are the cables, and it is very seldom that we have any fault to find. Planking for the most part is furnished by the contractor himself, and this has to be watched because an unsafe board may mean death or serious injury to a workman.

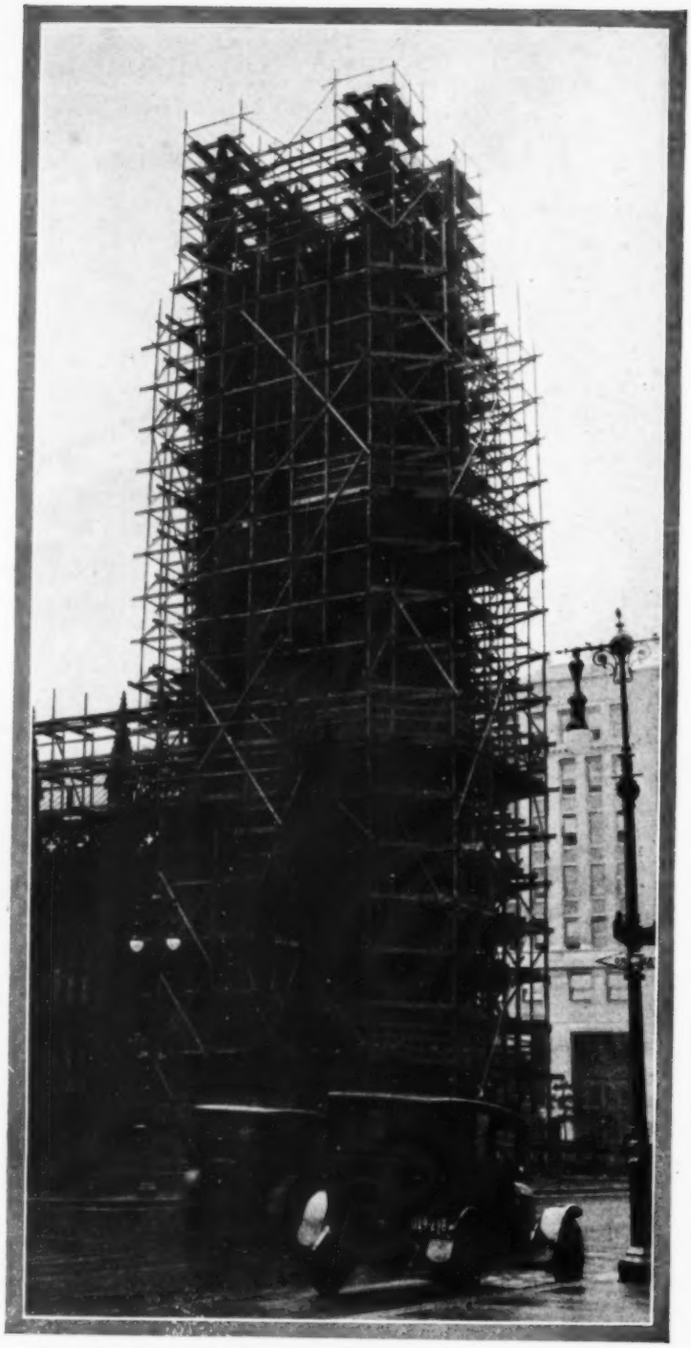
"As much cannot be said for the safety of outrigger scaffolding that is not suspended. Our rules are very specific as to the dimensions of lumber that may be used in such work, and we require that scaffolds be built by experienced and skilled workmen. These rules we cannot enforce, however, unless we have a man on the job all the time, and the result is that with outriggers which are extended through window openings we have a great deal of difficulty. Too many of the smaller contractors entrust scaffold building to their laborers and they, seemingly, have no regard for safety. One of the most common abuses we find is that of resting the outrigger on loose bricks or small, detached pieces of wood. Often these scaffold outriggers are poorly anchored or secured within the building, and the element of danger is thereby increased.

"The built-up scaffold for heights greater than 14 ft. is another source of great danger to the workman. Common practice on small buildings has called for the use of 2x4's for posts and 1x6-in. ledger boards and bracing by furring strips. All of these are outside the law and subject the contractor to a penalty for their use. They are not safe, yet it is surprising to see the number of scaffolds built up of just such materials. Perhaps the table at the bottom of the page from Rule 1223 of the Industrial Code will be of help in explaining just what the Department requires.

"Before getting away from the subject of scaffolds it might be well to say that the commonest violations, even with the suspended and outrigger scaffolds are found in the absence of protecting railings and toeboards. The law requires substantial railings on the outside of all scaffolds and also toeboards. The railings have to be not less than 42 in. in height, and the toeboards have to be at least 9 in. high and of substantial material.

"In small house construction the use of iron brackets is becoming more and more common, but we have found that many of those on the market are not really safe and we have condemned all except a few types. We have found that the bracket which is bolted or screwed into the studding or which has an arm which passes around the back of the stud is perfectly safe. But those which depend upon nails for attachment to the building or which merely slip over the edge of a sheathing board are not safe.

"The safeguarding of stairwells, floor openings and elevator shafts has always been well taken care of in the large buildings but unguarded stair openings provide one of the commonest violations in the small house field. Our rules require heavy railings well secured and toeboards around stairwells, but we rarely find them on the small jobs. The workmen themselves seem to resent their presence because it often hampers the easy handling of material but safety must come first."

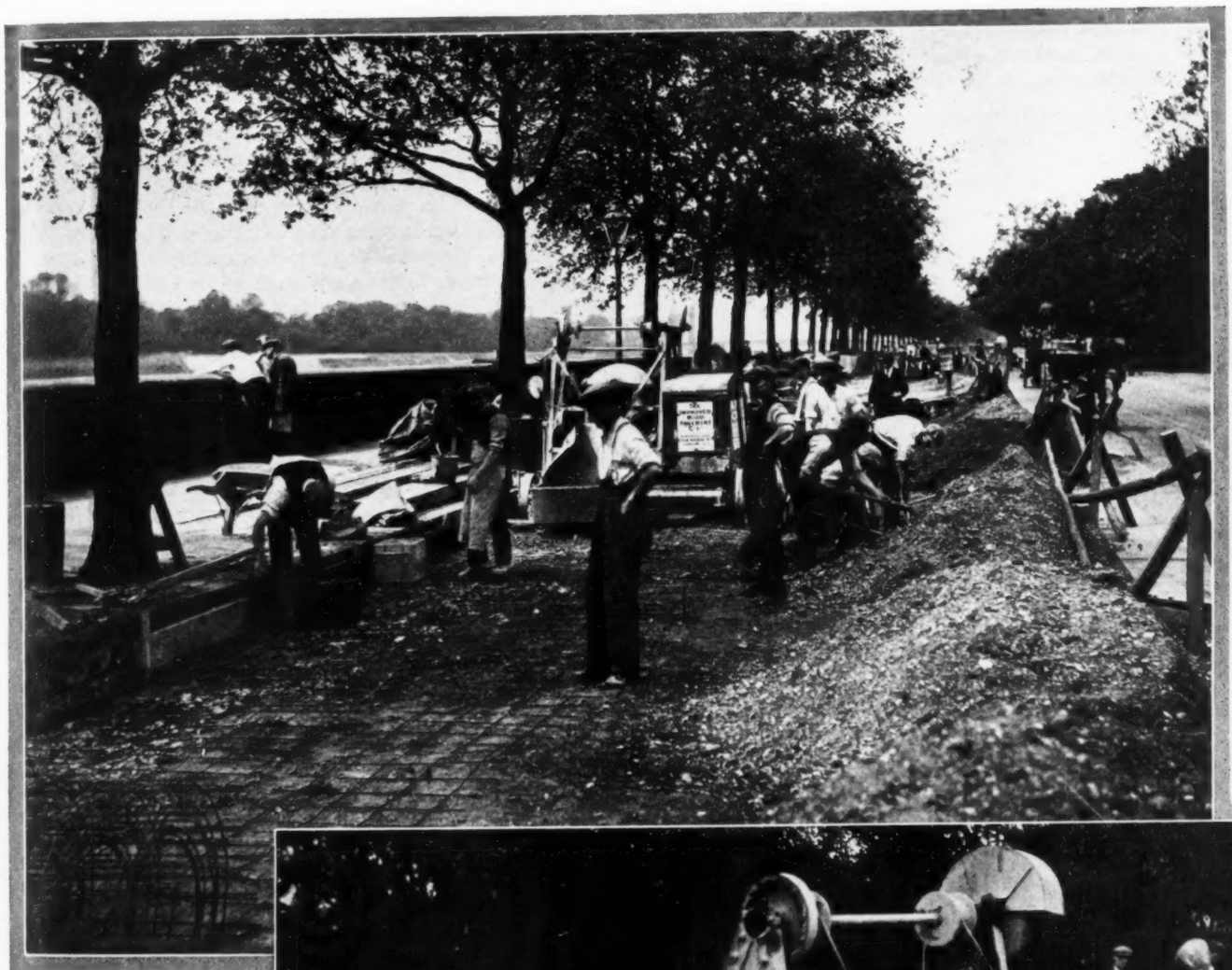


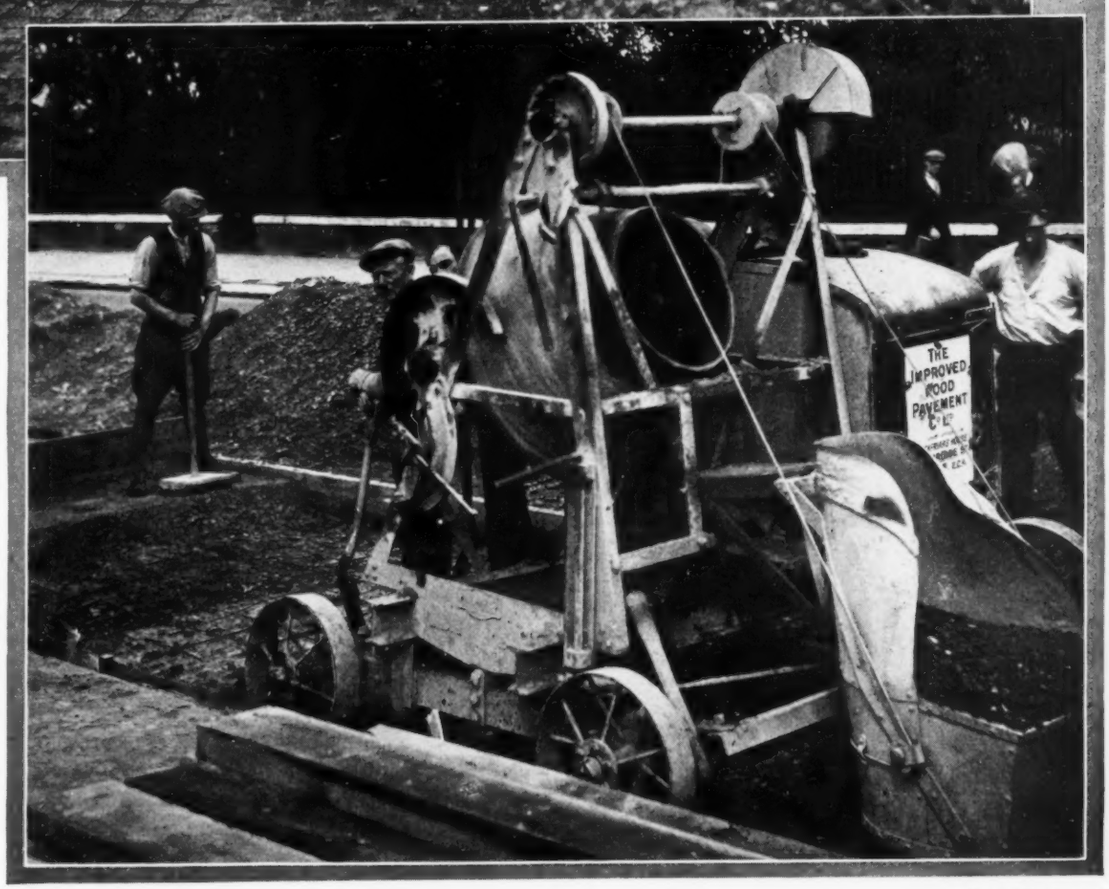
Scaffolds like this on a New York City church must be carefully built

	Plasterers	General	Bricklayers	Stone masons
Posts—end	3″ x 4″	3″ x 4″	4″ x 4″	4″ x 6″
Posts—middle	3″ x 4″	3″ x 4″	.....	4″ x 4″
Runners	1¼″ x 4½″	1¼″ x 4½″	1¼″ x 9″	1¼″ x 9″
Bearers— top	.....	1¼″ x 9″	.....	.....
Bearers	2″ x 9″	1¼″ x 4½″	2″ x 9″	2″ x 9″
Splice pieces	1¼″ x 4″	1¼″ x 4″	1¼″ x 4″	1¼″ x 4″ and 1¼″ x 6″
Braces	1¼″ x 4½″	1¼″ x 4″	1¼″ x 9″	1¼″ x 9″
Spacing posts — longitudinal	6′	6′	10′	6′
Spacing posts—transverse	12′	12′	10′	10′
Spacing sections—vertical	6′	6′ 6″	9′	9′
Distance, wall to posts	22″	22″	31″	31″
Planking	1¼″ x 9″	1¼″ x 9″	2″ x 9″	2″ x 9″
Railing	.....	.....	1¼″ x 4½″	1¼″ x 4½″
Toeboard	.....	.....	2″ x 9″	2″ x 9″

Scaffolds over sixty (60) feet in height: Plasterers: End posts 4″ x 4″. Bricklayers: End posts 4″ x 6″ half way up. Stone masons: End posts 6″ x 6″. Middle posts 4″ x 6″. Scaffolds over eighty (80) feet in height: General: End posts 4″ x 4″ half way up. Middle posts 4″ x 4″ half way up.

A Concrete Road Beside the Thames





British paving methods differ from those in the United States in a number of ways. The accompanying photographs show a small concrete mixer in use on the Chelsea embankment, London. This road was constructed in four 10-ft. strips with expansion joints at 50-ft. intervals. Mesh reinforcing was used and hand finishing was in order. Aggregates were dumped at the roadside. Wood forms were used

NEW EQUIPMENT ON THE JOB

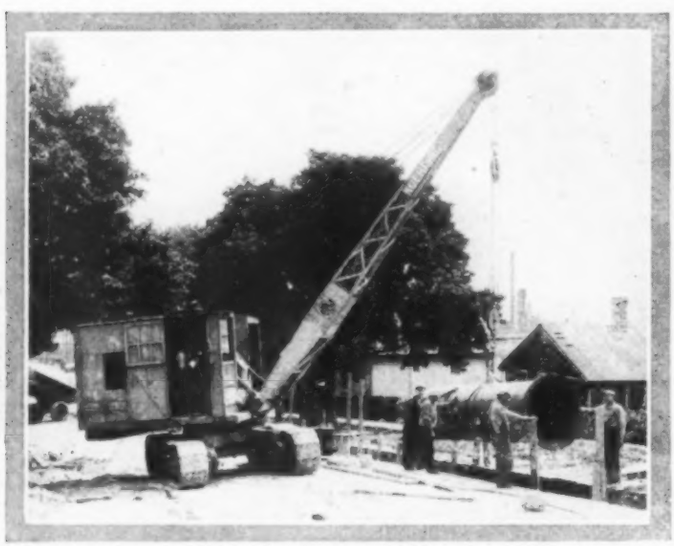
Grader for Two-Ton Tractor

A new one-man motor grader with a 2-ton Caterpillar tractor as motive power has been put out by the Austin-Western Road Machinery Co. of Chicago. The machine in

the photograph is being operated by Langlade County, Wis., and is used mainly for maintenance work. The grader is made as an attachment, the necessary parts for attaching it to the tractor being furnished with it.

Shovel, Crane or Dragline

A new machine, adapted to various uses and known as No. 501, is being made by the Koehring Co. of Milwaukee.



This machine can operate either as a shovel, crane or dragline and has a capacity of 1 to 1½ cu.yd. of material.

With this machine, it is possible to make a choice of three sizes of dipper, depending on the length of dipper stick and the kind of work for which the machine is to be used. With 13-ft. sticks, a 1½-cu.yd. dipper is furnished; with 16-ft. sticks, a 1¼-cu.yd. dipper, and with 19-ft. sticks, a 1-cu.yd. dipper. The boom length is 24 ft. in each case.

Various other qualities of the new machine add to its efficiency, such as the power dipper trip, the special swiveling boom point fairlead for the dragline, and cast steel car body. The motive power is a Koehring-Wisconsin 4-cylinder gasoline engine, although the alternative of an electric motor is offered. The smaller size machine, known as No. 301, with capacities ranging from ⅝ cu.yd. to 1 cu.yd., also is built.

A New Trench Hoe

A trench hoe with a goose-neck boom is now being manufactured by the Harnischfeger Corp. of Milwaukee, Wis. This type of hoe is one of a number of attachments for the power units made by the Harnischfeger organization. The

goose-neck boom makes it possible to dig to a greater depth than with the old straight type. These trench hoes are made for use with the 1-yd. and 1¼-yd. Harnischfeger machines. The 1-yd. machine, known as model 600, cuts trench from 38 to 42 in. wide. The 1¼-yd., model 700, cuts trench from 46 to 52 in. wide. The model 700 trench hoe shown in the accompanying photograph is owned by Frank Piacenee & Co., Chicago Heights, Ill.

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The more-work value of the Haiss patented combined *propeller-feeding* and 3 ft.-a-minute *crowding drive* alone will repay the dollars-and-cents cost difference in a full season's work. And the Haiss-built-*transmission* with all clutches and gears running in oil again makes the machine the least expensive to own.

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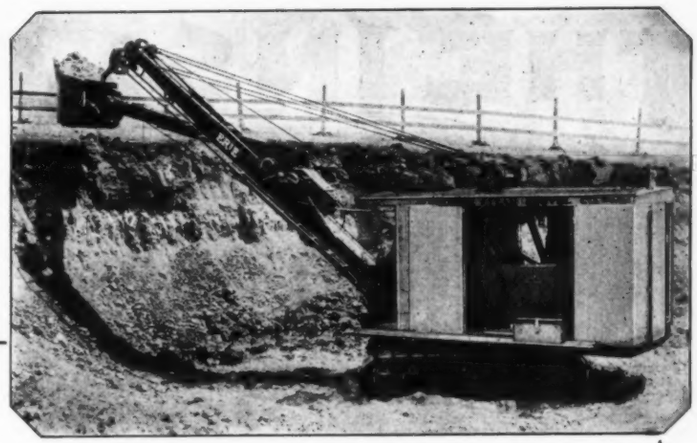
"The output of our Gas+Air ERIE both as shovel and as crane with clamshell, is even better than we figured it would be. We know that it will outclass any other machine of its size *anywhere*. The reliability of the Gas+Air ERIE is perfect—have had wonderful service and no trouble."



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"We have found the ERIE to be very reliable, and its output has been exceptionally good. We have only seen one shovel that we would like better than the Steam Erie, and that is the Gas+Air ERIE."

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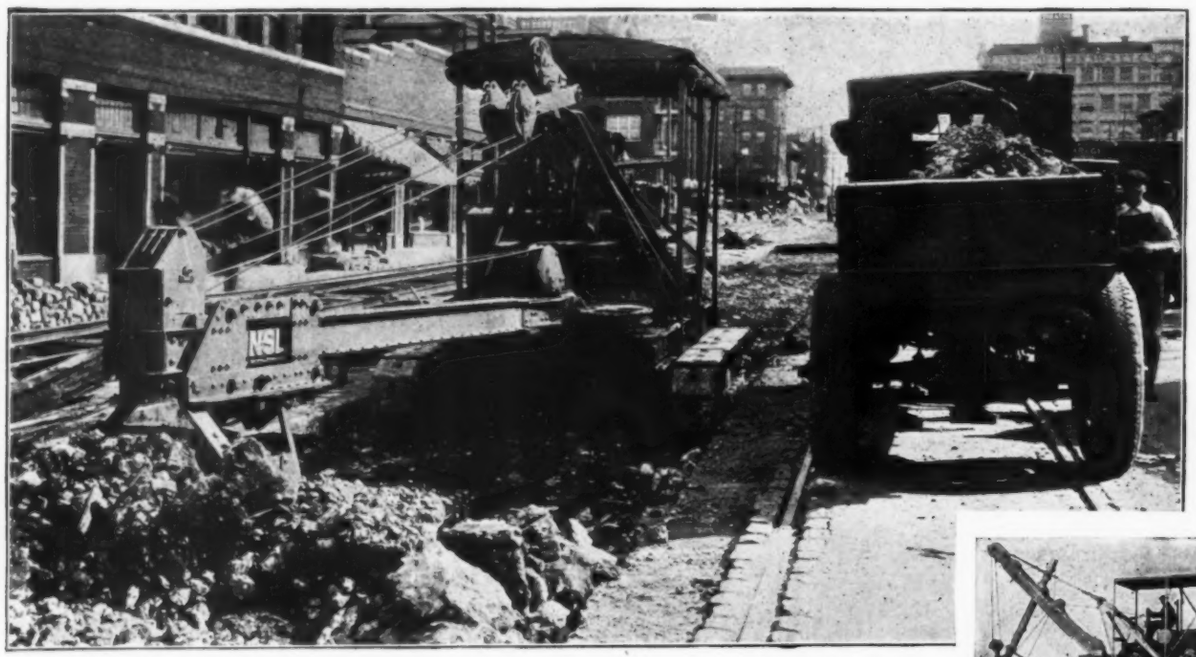
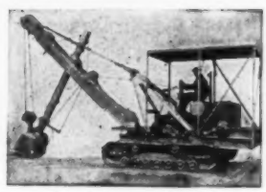
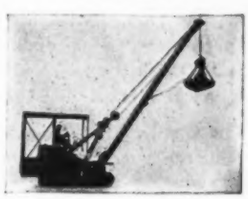




SHOVEL

DITCHER



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DRAGLINE

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UNDER cramped working conditions, with street car, truck and automobile traffic on both sides, this Insley Skimmer, owned by the Kansas City Public Service Company, is digging up old track pavement. The material consists of an old concrete roadbed which is broken up by paving breakers.

It is hard material to handle, and the Insley is handling a daily average of 100 to 110 truck loads having a capacity of 2½ cubic yards each. Furthermore, it travels conveniently in a space only 9 feet wide.

The Insley Excavator, with any of its six attachments, can do any job economically no matter how hard the digging, or how exacting the conditions.

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Model 105
1 cu. yd. shovel

Model 104
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HERE is a real basement digger that does away with the delay and trouble of putting a shovel or trucks into the hole, and it eliminates the necessity of leaving a runway. This Northwest Pull-shovel is one of three owned by Carlo Petrillo of Mt. Vernon, N. Y., and it is digging a basement where quicksand made conditions impossible for the use of a standard shovel even on mats.

The Pull-shovel was pioneered by and has reached its highest development in the Northwest.

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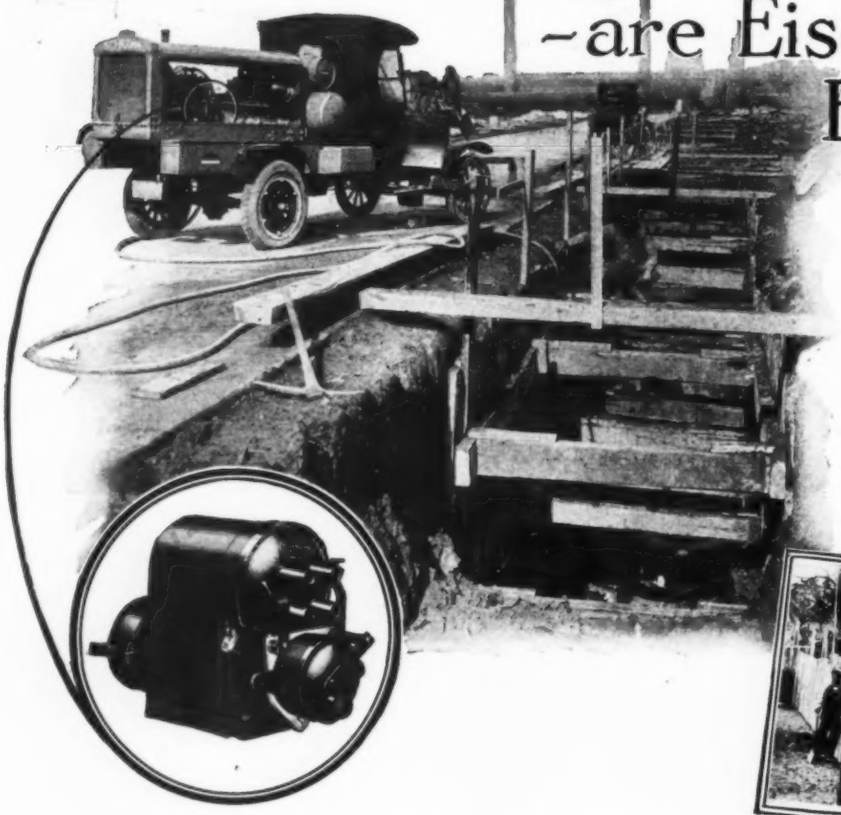

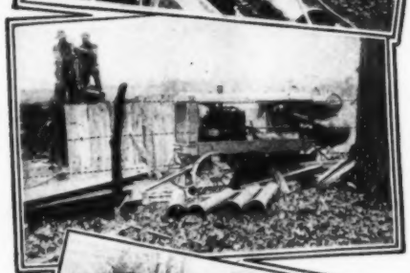

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"HERCULES" (RED STRAND) WIRE ROPE

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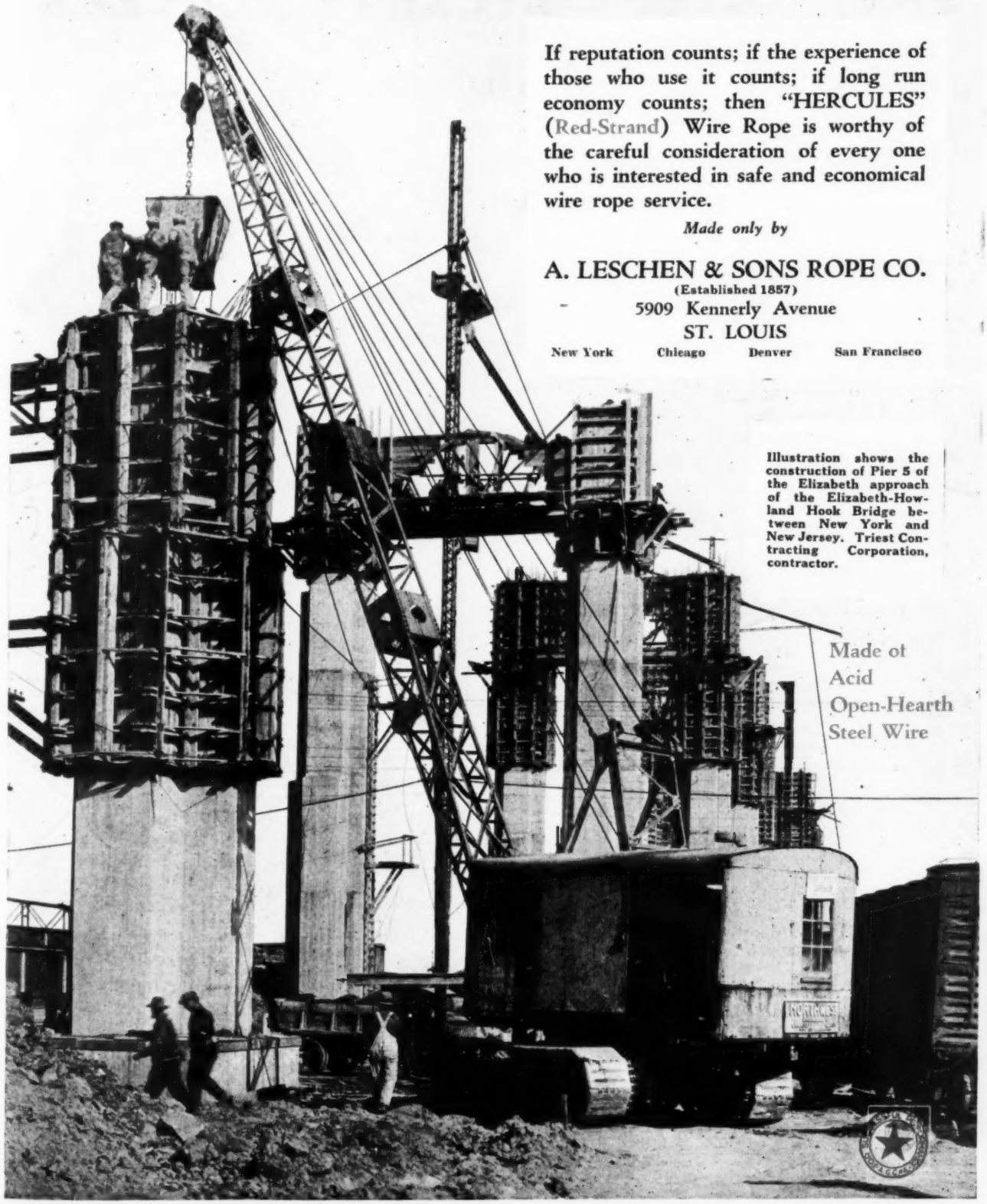


If reputation counts; if the experience of those who use it counts; if long run economy counts; then "HERCULES" (Red-Strand) Wire Rope is worthy of the careful consideration of every one who is interested in safe and economical wire rope service.

Made only by

A. LESCHEN & SONS ROPE CO.
(Established 1857)
5909 Kennerly Avenue
ST. LOUIS

New York Chicago Denver San Francisco

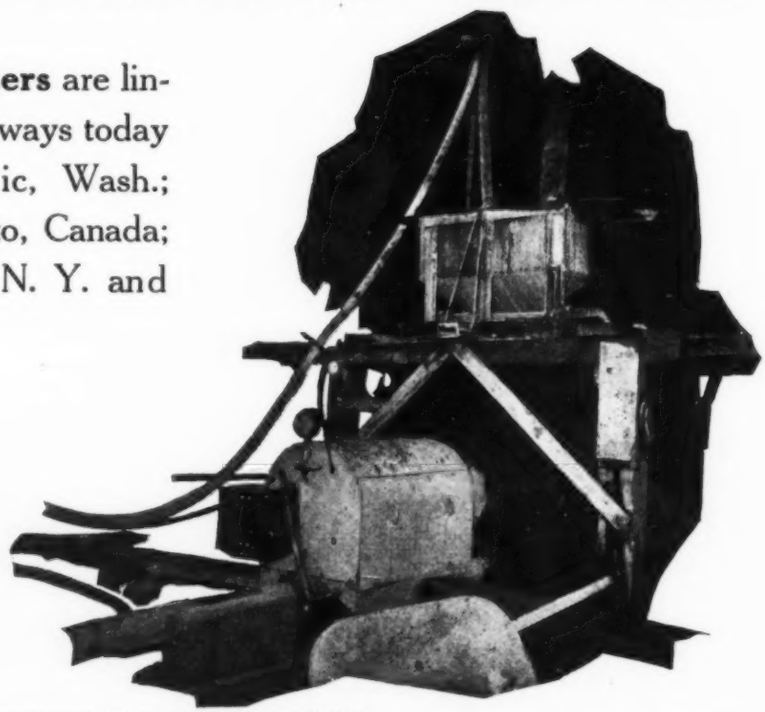
Illustration shows the construction of Pier 5 of the Elizabeth approach of the Elizabeth-Howland Hook Bridge between New York and New Jersey. Triest Contracting Corporation, contractor.

Made of Acid Open-Hearth Steel Wire

• RANSOME •

PNEUMATIC CONCRETE PLACERS

Pneumatic Concrete Placers are lining the big tunnels and subways today at Chelan Falls and Scenic, Wash.; Calderwood, Tenn.; Toronto, Canada; Santos, Brazil; New York, N. Y. and many other places.



If you have a tunnel to line—or any similar job—give us the answers to the questions below. We'll give you an idea of what Ransome Pneumatic Placers will do on your particular job, the costs and the savings, and without obligation on your part. If we recommend the use of a Ransome Pneumatic we'll *guarantee* its performance.

1. Length of tunnel, end to end.....
2. Length between shafts.....
3. Height and width in rough.....
4. Height and width, finished section.....
5. Minimum thickness of concrete and point at which it is found.....
6. Amount and location of reinforcing.....
7. Is tunnel in rock or earth?.....
8. Will tunnel excavation be completed before lining?.....
9. If mucking, while lining, must muck cars pass through forms?.....
10. If in soft ground, will concreting follow up behind heading?.....

Estimated distances.....

11. Length of form used, steel or wood, and print of same.....
12. Type of concrete cars. Height and width .....
13. Locomotive (if used). Height and width .....
14. Size and kind of gravel or stone used.....
15. Compressed air available in cubic feet per minute.....
16. Will drills, air hammers, etc., operate from this supply when blowing concrete? .....
17. Gauge and size of track used.....
18. Electric current available for operating 7½ hp. motor.....
19. How much yardage to be placed by air is involved?.....
20. Make sketch showing measurements mentioned in 3, 4, 5 and 6.

Name of Contractor or Engineer.....

Address.....

Location of Job.....

A Ransome Pneumatic Concrete Placer being used for New York Subway Work on the De Balso Construction Corporation's job at 183rd St. and Fort Washington Ave., New York City.

Agents in all principal cities

RANSOME CONCRETE MACHINERY CO.

Dunellen **New Jersey**

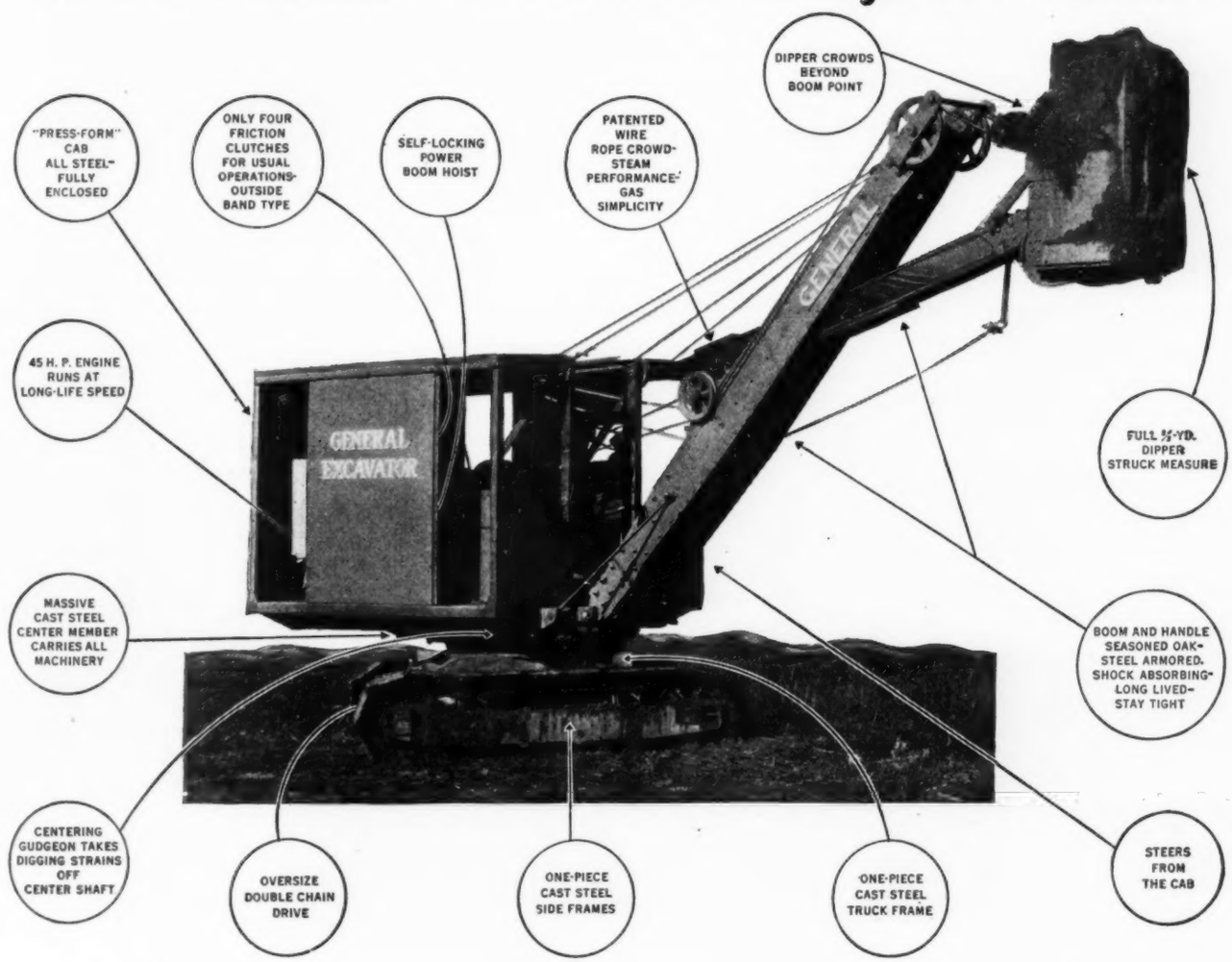
1850—SERVICE FOR 77 YEARS—1927

Ransome Pneumatic Concrete Placers

The General Excavator

FULL REVOLVING

Shovel - Crane - Clamshell - Dragline - Trencher


DIPPER CROWDS BEYOND BOOM POINT
"PRESS-FORM" CAB ALL STEEL-FULLY ENCLOSED
ONLY FOUR FRICTION CLUTCHES FOR USUAL OPERATIONS-OUTSIDE BAND TYPE
SELF-LOCKING POWER BOOM HOIST
PATENTED WIRE ROPE CROWD-STEAM PERFORMANCE-GAS SIMPLICITY
45 H. P. ENGINE RUNS AT LONG-LIFE SPEED
FULL ¾-YD. DIPPER STRUCK MEASURE
MASSIVE CAST STEEL CENTER MEMBER CARRIES ALL MACHINERY
BOOM AND HANDLE SEASONED OAK-STEEL ARMORED-SHOCK ABSORBING-LONG LIVED-STAY TIGHT
CENTERING GUDGEON TAKES DIGGING STRAINS OFF CENTER SHAFT
OVERSIZE DOUBLE CHAIN DRIVE
ONE-PIECE CAST STEEL SIDE FRAMES
ONE-PIECE CAST STEEL TRUCK FRAME
STEERS FROM THE CAB
GENERAL
GENERAL EXCAVATOR

BULLETIN 2703 WILL GIVE YOU MORE REASONS WHY GENERAL EXCAVATOR LEADS THE HALF YARD FIELD.
A DEMONSTRATION WILL PROVE IT

General

THE GENERAL EXCAVATOR COMPANY - MARION, OHIO, U. S. A.

Made to Match "CATERPILLAR" RUGGEDNESS!

FULL CREDIT for "Caterpillar" performance is due the stout implements for road building and dirt-moving today offered by scores of manufacturers.

Strength and stamina in design and construction of scraper, grader, scarifier, bull-dozer and road plow take full advantage of the power of "Caterpillar" track type tractors.

A "Caterpillar" outfit achieves a notable economy of operation because there is no weak link between power generated and work performed.

—there is a "Caterpillar" Dealer near you

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2-TON . . . $1850
Peoria, Illinois

THIRTY . . $3000
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BETTER
QUICKER
CHEAPER

CATERPILLAR TRACTOR CO.
Executive Offices: San Leandro, California, U. S. A.
Sales Offices and Factories:
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Distributing Warehouse: Albany, N. Y.
New York Office: 50 Church Street
Successor to
BEST (C. L. Best Tractor Co.) (The Holt Manufacturing Company) HOLT

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CATERPILLAR
REG. U.S. PAT. OFF.

Built on this Foundation

UNIVERSAL CRANES possess a speedy mobility unequalled by any other crane!

Universal was the first crane designed primarily for mounting on a motor truck chassis, thus giving it the speedy mobility of a motor truck in traveling from job to job—15, 20, 25 miles per hour.

Universal Mobility has always led the field and is more pronounced now than ever by the Universal Crane Motor Truck Crawler, an attachment used, as applied to crane mountings, EXCLUSIVELY on Universals.

This attachment gives an 8 wheel, fully rubber tired truck that travels the highways 16 M. P. H.—and which in 5 minutes can be changed to a full crawler rear end that "eats" up soft ground travel —and does it at a speed of 14 M. P. H.

It combines Motor truck speed with Crawler soft ground traveling ability—Can you beat this for MOBILITY?

Ask for a copy of Bulletin No. 44—G.
It tells more of Universal Mobility.

THE UNIVERSAL CRANE CO.

"Largest and Only Exclusive Builders of Truck Cranes"

985 Swetland Bldg. Cleveland, O.

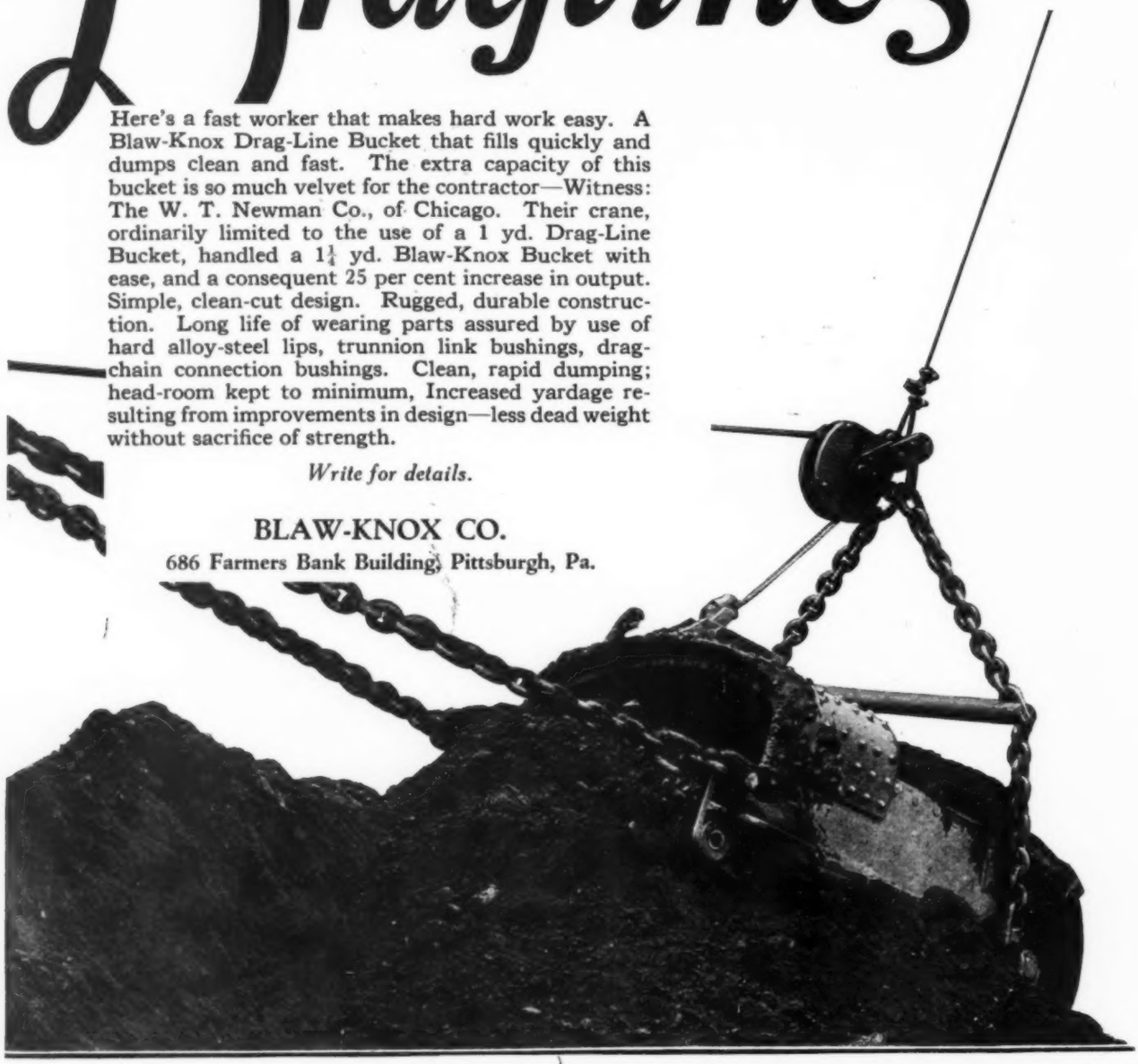
Draglines

Here's a fast worker that makes hard work easy. A Blaw-Knox Drag-Line Bucket that fills quickly and dumps clean and fast. The extra capacity of this bucket is so much velvet for the contractor—Witness: The W. T. Newman Co., of Chicago. Their crane, ordinarily limited to the use of a 1 yd. Drag-Line Bucket, handled a 1¼ yd. Blaw-Knox Bucket with ease, and a consequent 25 per cent increase in output. Simple, clean-cut design. Rugged, durable construction. Long life of wearing parts assured by use of hard alloy-steel lips, trunnion link bushings, drag-chain connection bushings. Clean, rapid dumping; head-room kept to minimum, Increased yardage resulting from improvements in design—less dead weight without sacrifice of strength.

Write for details.

BLAW-KNOX CO.

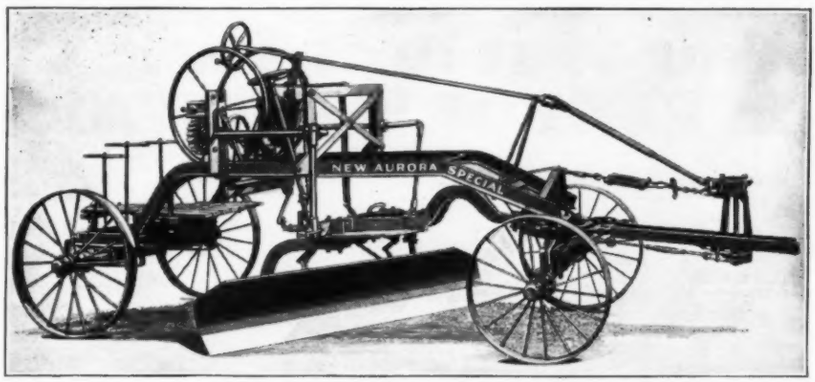
686 Farmers Bank Building, Pittsburgh, Pa.



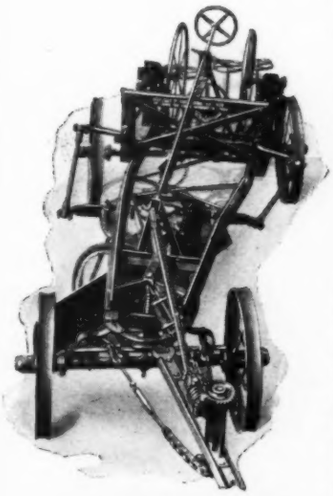
B-1890

BLAW-KNOX

A Light Tractor Can Handle It —

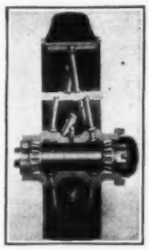


A Heavy Tractor Can't Hurt It



THE PIVOTAL AXLE

When the side load on the blade becomes heavy, the operator resists it and holds his machine to a straight course by pivoting the rear axle and placing the wheels and frame in the position illustrated above. The Aurora rear axle is also extensible, and thus provides unequalled flexibility.



While the standard wheels, with their concave steel tires and plain bearings with renewable axle sleeves, are entirely satisfactory for the work of grading and ditching; when it comes to maintenance we recommend this special roller bearing wheel, which may be had with either steel or rubber tire. The Timken Tapered Roller Bearings are the only ones that will stand successfully the variable loads to which they are subjected, and they can also be taken up for wear. A tight-fitting dust cap, and Alemite lubrication, complete what we believe to be the most satisfactory grader wheel on the market.

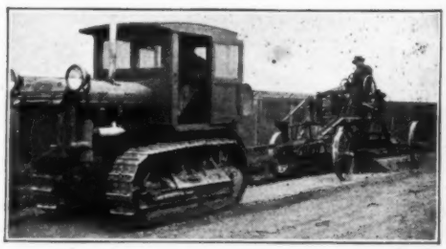
To Those Who Do Not Need Heavy, Expensive, Power Consuming Graders:—

You will be glad to learn that a machine light enough and inexpensive enough to be used on ordinary work, yet with strength to do the more difficult job properly, is now available.

The Secret of this Unusual Strength

By means of the famous Western Direct Draft, all the power of the pull is transmitted directly to the blade assembly—thus relieving the frame of absolutely all draft strains. This blade assembly—which absorbs all the strain and the stress—is built for heavy duty, with strong heavy goosenecks and one-half inch high carbon steel blade and bit, reinforced with heavy steel angle, so the improved Aurora Special can be used behind a 5-ton crawler tractor without fear of blade injury or frame distortion. The skill and experience of our engineers, the superior manufacturing facilities of our modern factories are back of it; and the result is exceptional strength, the like of which has heretofore been found only in heavy graders.

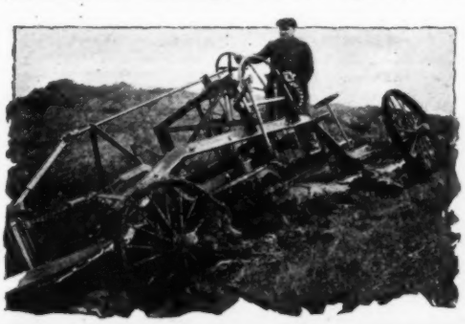
The interesting story of this 3500-lb. giant among medium-sized graders is yours for the sending in of the coupon.



Self-locking, non-reversing, cut steel blade raising gears and worms, and ball and socket raising rod connections, combine to make the Aurora Grader a "no lost motion" machine, which is well adapted to the maintenance of earth, gravel and sand clay roads.

The photograph above shows how the entire pull of the power is transmitted directly to the blade assembly, the frame being relieved of all draft strains. This is the principal reason why Aurora Graders can be used successfully on much more difficult work than can ordinary graders of their weight.

The Austin-Western Road Machinery Co.
400 No. Michigan Blvd., Chicago, Ill.



THE AUSTIN-WESTERN ROAD MACHINERY CO.
400 No. Michigan Blvd., Chicago, Ill.

Please send descriptive catalog on New Aurora Special Grader

Name.....

Address.....

Town.....*State*.....

—A Pair that Rest Their Claims On PERFORMANCE Alone

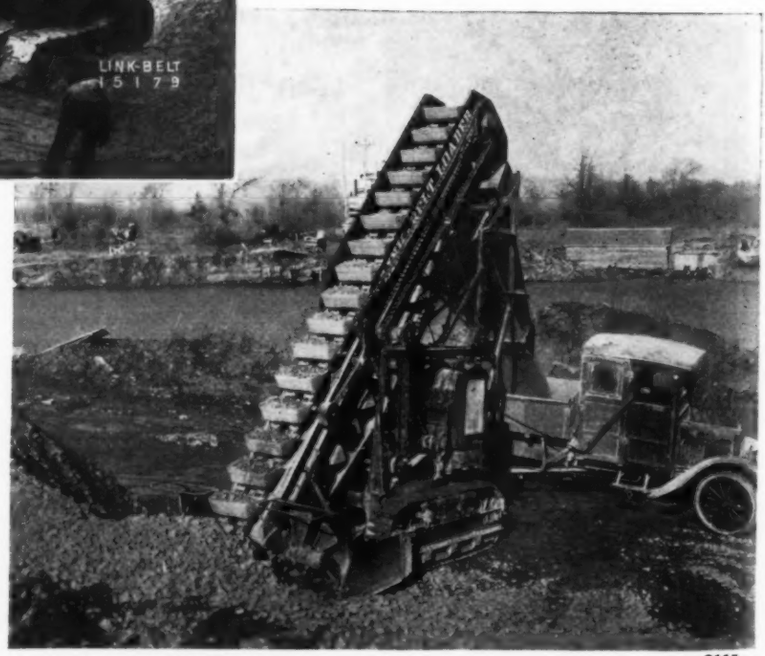
The Link-Belt Shovel

SPEED, reliability, superior performance at lower cost and our increasing sales—briefly sum up the reasons why it is more profitable to contract with Link-Belt "Built for Service" Crawlers. Built with crane, shovel, drag-line, trench shovel and other approved attachments, their remarkable performance records on jobs all over the country is bringing "gain" to the owners; and satisfaction, to us, as makers. For full information in Book No. 895.

The Link-Belt "Grizzly" Loader

The quick-acting strike-off of the Link-Belt "Grizzly" Loader insures accurate batching. The rapid loading capacity makes every minute pay. Equipped with self-cleaning crawler treads it moves over rough or broken ground with ease.

Address nearest office ask for "Performance Data"



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Leading Manufacturers of Elevating, Conveying, and Power Transmission Machinery and Chains

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Shovels and Loaders

"In a few months *this crane will not owe us anything"*

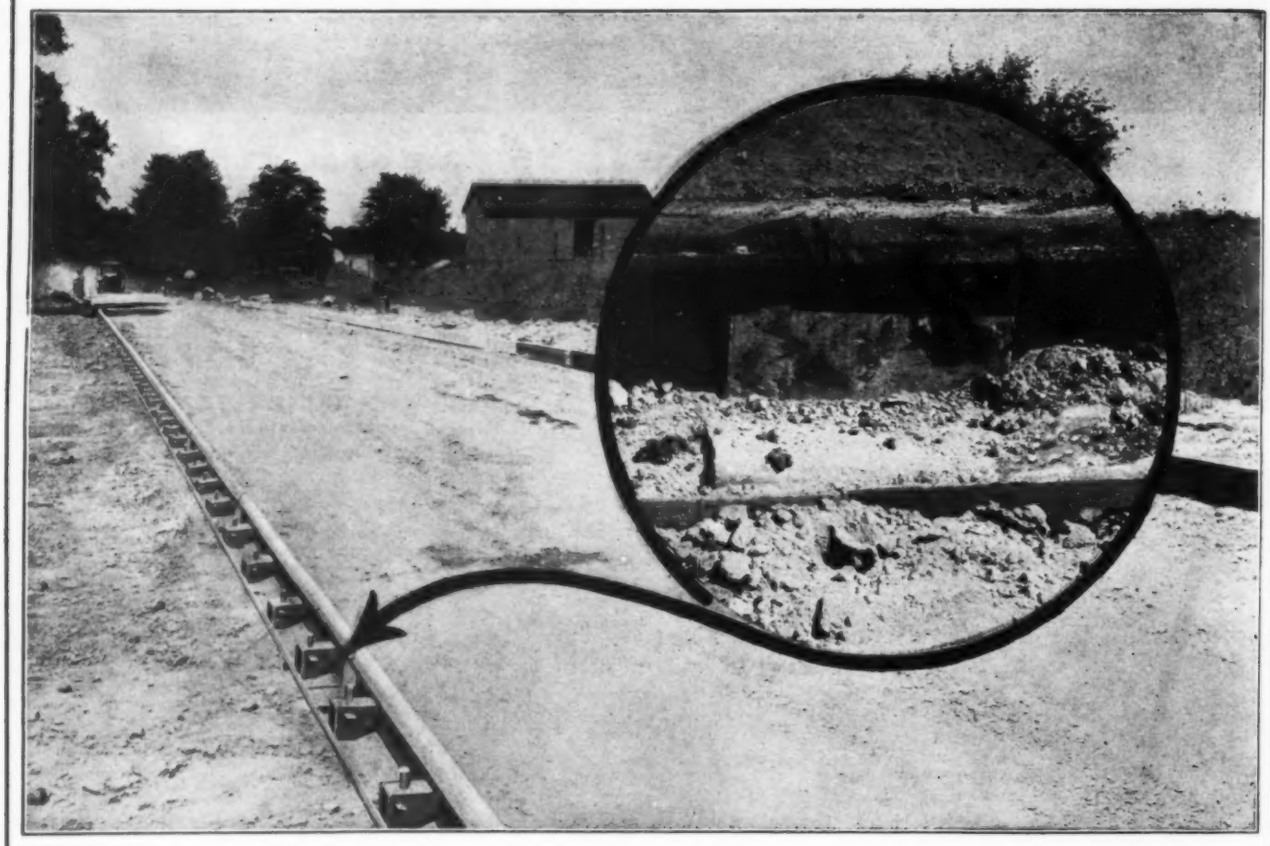
— WESTERN CONCRETE PIPE CO.
LOS ANGELES

WESTERN CONCRETE PIPE COMPANY
REINFORCED CONCRETE PIPE FOR
SEWERS, STORM DRAINS, CULVERTS, IRRIGATION SYSTEMS
MANUFACTURERS OF MACHINE MADE CONCRETE PIPE
CITY INDUSTRIAL TRACT
LOS ANGELES, CALIFORNIA
June 8, 1927.
The Buckeye Traction Ditcher Co.,
Findlay,
Ohio.
Gentlemen:
In reply to your inquiry of June 2nd, we will be very glad to permit you to publish the photograph of the Buckeye Model "O" Backfiller Crane in use at our Los Angeles Plant.
It gives us a great deal of pleasure to recommend this Backfiller Crane for work of a similar nature, that is, in tipping the large pipe to a horizontal position and in loading the smaller diameters of pipe on trucks.
It makes a very handy loader for pipe up to 54", weighing about 2½ tons.
We find that by using this Crane to assist in loading of the pipe in the early morning that we are enabled to save a half hour's trucking time during the day on some 20 or 25 trucks. This work is in addition to its ordinary work around the Yard during the remainder of the day.
We therefore feel that in a very few months this Crane will not owe us anything.
Very truly yours,
WESTERN CONCRETE PIPE COMPANY.
By J. M. McAdam
Gen'l. Supt. & Engineer.
JMM/WH
Buckeye
Model
"O"

This Backfiller-Crane with great service range costs but little more than the ordinary backfiller of limited working ability. Illustrative and descriptive Bulletin mailed on request.

THE BUCKEYE TRACTION DITCHER CO., FINDLAY, OHIO

Buckeye✓ TRENCH EXCAVATORS FOR OVER 30 YEARS



An Exclusive Feature of The CARR ROAD FORM

The Wedge Lock Joint

The Wedge Lock Joint of the Carr Road Form insures a smooth connection between the sections. The upright wedge member forces the top surface of the forms into perfect alignment.

There can be no offset at the joint for the strike off to foul, or to cause unevenness in the road. Maximum strength is given to support the concentrated load as the wheels of the finisher pass over the joint.

There are other features of Carr Road Form such as the ROUND TOP, the TWELVE-FOOT LENGTH SECTION, FOUR WELDED STAKE POCKETS per section, etc.

Write for bulletin 45-S for complete details.

The Lakewood Engineering Company
Cleveland, O.

Please tell me all the advantages of the Carr Road Form.

Name .....

Address .....

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The EXPORT OFFICE: 30 CHURCH ST., NEW YORK CITY—*CABLE ADDRESS:* BROSITES

LAKEWOOD ENGINEERING CO.

CLEVELAND, OHIO

PERMANENT AS THE PYRAMIDS OF EGYPT

and—

Dustless!

CONCRETE has probably developed into the most widely used base for flooring and driveways. But concrete has its disadvantages. It is hard, unyielding, liable to disintegrate.

The continual friction from heavy trucking and other traffic daily grinds up concrete or brick floors into minute particles of dust. This process of disintegration, if excessive, affects the bearings of delicate machinery and renders the floor open to attack of any acids and alkalies used in manufacturing processes. The loss is not immediately perceptible, but is there, nevertheless.

There is no better-wearing, free-from-dust flooring than a concrete floor resurfaced with 1 2 3 Hydro-Proof. Its tough resiliency makes it dust-proof. It is water, acid, chemical, alkali, spark and vermin-proof. Why? Because it is asphalt. No chipping out of old material is necessary in preparing concrete or brick floors for repairs. 1 2 3 Hydro-Proof can be laid to a feather edge.

Every engineer and chemist knows the enduring, resilient qualities of asphalt. Hydro-Proof is pure asphalt, atomized and suspended in water, by our own special process. Try Hydro-Proof, applied according to our 1 2 3 Formula, the next time your floors need repairing or resurfacing. We'll send you a working sample, without charge, upon your request. Use coupon below.

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TRADE MARK REGISTERED IN U.S. PATENT OFFICE

The Asphalt Products Co., 704 FREE STREET SYRACUSE, N. Y.

The World's Most Enduring Material

Please send me a working sample of HYDRO-PROOF and your 123 Formula, without placing me under any obligations. 704F.

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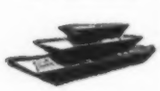
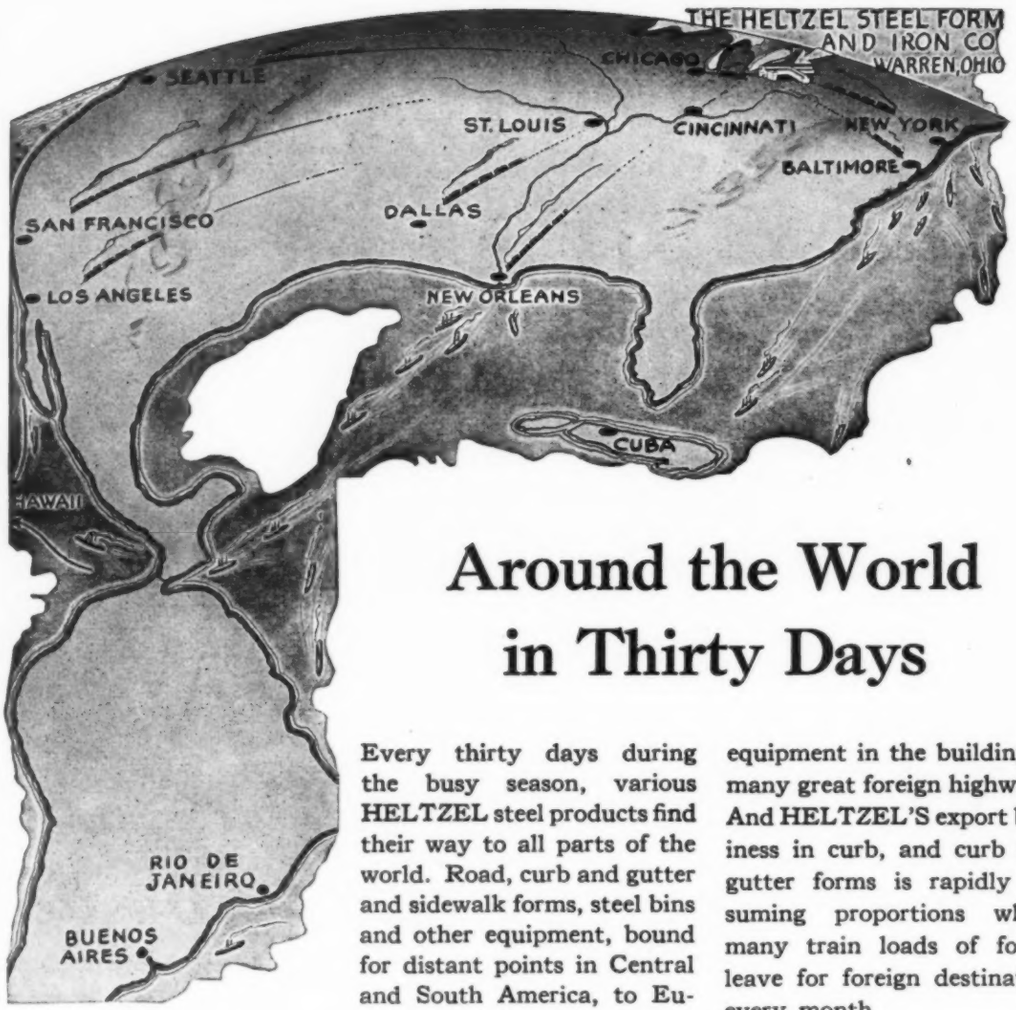

Mixing Boxes

Tool Boxes



Around the World in Thirty Days

Every thirty days during the busy season, various HELTZEL steel products find their way to all parts of the world. Road, curb and gutter and sidewalk forms, steel bins and other equipment, bound for distant points in Central and South America, to Europe, to Asia and even to African Ports where the economy and efficiency of HELTZEL products has become recognized.

HELTZEL Steel Road Forms are now becoming standard equipment in the building of many great foreign highways. And HELTZEL'S export business in curb, and curb and gutter forms is rapidly assuming proportions where many train loads of forms leave for foreign destination every month.

This world wide recognition of HELTZEL Steel Products has come as a natural result of 18 years of anticipating the future requirements of contractors and engineers.

The HELTZEL general catalogue illustrates and describes more than 30 different kinds of contractors products. Every contractor and engineer should write for a copy. No cost or obligation.

THE HELTZEL STEEL FORM & IRON CO. - - WARREN, OHIO

HELTZEL

Rogers Heavy Duty Trailers up to 60 Tons Capacity Built for the following:

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McCrady Brothers Co. . . . . Braddock, Pa.
Penn Public Service Corporation. . . . . Johnstown, Pa.
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Ambler-Davis Co. . . . . Philadelphia, Pa.
Mayer Brothers Co. . . . . Erie, Pa.
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J. Cape & Sons. . . . . Racine, Wis.
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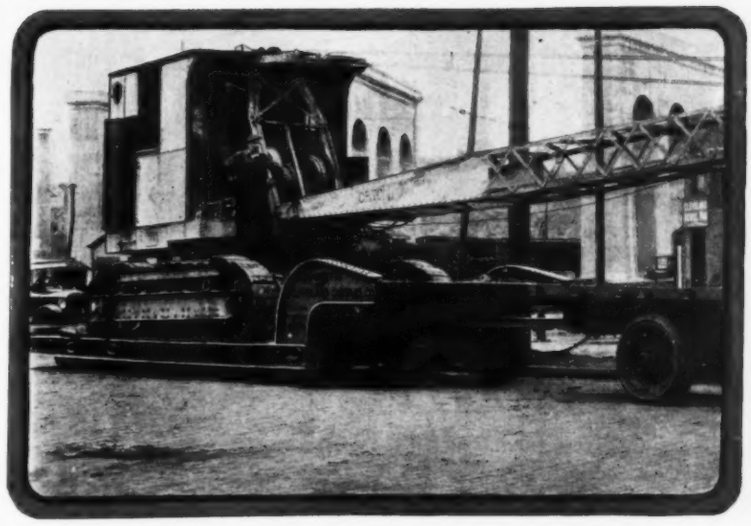
County of Delaware. . . . . Delancey, N. Y.
P. J. McGuire . . . . . Camden, N. J.
J. J. McNally. . . . . Hempstead, L. I., N. Y.
W. H. Hall Const. Co. . . . . Hartford, Conn.
Vitale, Gagilardi, Pisani & Co. . . . . Peekskill, N. Y.
Chas. Morlock. . . . . Philadelphia, Pa.
Bernardo & Duelfer. . . . . Bronx, N. Y.
J. E. Miller Transfer & Storage Co. . Wheeling, W. Va.
Wm. Garvin, Inc. . . . . New York, N. Y.
G. M. S. Co. . . . . Cleveland, Ohio
Highway Department. . . . . Brookline, Mass.
R. F. Post. . . . . Scranton, Pa.
Riefler Brothers . . . . . Buffalo, N. Y.
Swissvale Transportation Co. . . . . Pittsburgh, Pa.
Brown Cartage Co. . . . . Cleveland, Ohio
John Ryan & Son. . . . . Winfield, N. Y.
County of Oswego. . . . . Oswego, N. Y.
Hendrickson Brothers. . . . Valley Stream, L. I., N. Y.
Barber & Coccola. . . . . Rye, N. Y.
S. M. Brady . . . . . Brooklyn, N. Y.
Pennsylvania Gas Co. . . . . Warren, Pa.
Slattery Contracting Co. . . . . New York, N. Y.
Clark & Barone. . . . . New Haven, Conn.
Southern Dray Co. . . . . Asheville, N. C.
Edwards Transfer & Storage Co. . . . . Columbus, Ohio
Richard Burke, Inc. . . . . White Plains, N. Y.
Wm. H. Barker. . . . . Bronx, N. Y.
South Carolina State Highway Dept. Columbia, S. C. (3)*
W. A. Shafer Const. Corp. . . . . Poughkeepsie, N. Y.
Geo. M. Brewster & Son, Inc. . . . . Bogota, N. J.
H. B. Sproul Const. Co. . . . . Scranton, Pa.
Mussens Limited . . . . . Montreal, Canada

* Number of trailers in service.
**Number now in use.*



125 ROGERS HEAVY DUTY TRAILERS IN ACTIVE SERVICE

That's a lot of these big fellows when you consider the tremendously strong and solid construction, and that every one is built to specification. We can't grind them out—users needs vary too greatly, and close attention must be paid to details.

Built to transport fifty or sixty tons speedily and easily, Rogers Heavy Duty Gooseneck Trailers stand up to the job.

They are constructed to afford maximum protection to loads and roads. In addition, their roadability saves time and money.

We build carefully and conscientiously. We want our customers to repeat. And they do repeat. A glance at the accompanying list of users will sustain this claim. Tell us *your* problem. We will design a Rogers Heavy Duty Gooseneck Trailer to meet any requirement.

Dealers in heavy machinery will find the Rogers Heavy Duty Trailer an attractive addition to their line. Send for complete information.

ROGERS BROTHERS CORPORATION

ALBION, PENNA.

regardless of load . . . . . "let a LINN do it"

You can't find a job too unique for a *Linn!* It always has the pull to get through. One of the most convincing exhibitions of the drawing power of the *Linn* was given when the 34-ton transformer shown above was hauled from the Maynard crossing of the Adirondack Railroad to the new power station of the Utica Gas & Electric Company—a distance of seven miles.

The tractor, without difficulty, made the various grades and turns and crossed three bridges with ease and perfect safety. The tractor hauled five times its own weight, the combined weight of the load being 58 tons. In addition to the 34-ton transformer, it pulled a trailer weighing seven tons, and carried "traction" consisting of ten tons of small transformers.

The Utica Gas & Electric Company has purchased a Linn Tractor similar to the one which accomplished this heavy hauling work. It will be used in various capacities.

Just another case to show that Linn sales are brought about through proof and not promises.

"Let a Linn do it."

LINN MANUFACTURING CORPORATION, Morris, N. Y.

New York Office—507 Fifth Ave., Room 507—Murray Hill 5021, 5022

Mussens, Ltd., Montreal—Canadian Distributors

LINN MANUFACTURING CORPORATION TRACTORS

1916—TESTED ELEVEN YEARS IN ACTUAL SERVICE—1927

Clip the Coupon for this Bulletin -

Get your copy of this complete bulletin illustrating and describing the Marion Type 7, one yard, straight gas shovel, dragline and crane. The Type 7 is equipped with Hercules Engine, Timken Bearings, Dot Lubrication, Outside Band Clutches, choice of Gear or Rope Crowd, and scores of other profit-making features. Clip the coupon today—*now.*

THE MARION STEAM SHOVEL CO.
MARION, OHIO, U. S. A.

MARION

THE MARION STEAM SHOVEL CO., Marion, Ohio
Without cost or obligation, please send a copy of Bulletin 320 to
Firm Name
By
Address
Nature of work

"Install expansion joints at the time of construction"

---says Arizona Engineer

W. W. LANE, *Chief Engineer, Arizona Highways Department, Phoenix, Arizona*

"HERE in Maricopa County, Arizona," said W. W. Lane, Chief Engineer, Arizona Highways Department, Phoenix, Arizona, "the construction of concrete roads presents some very interesting problems. Sudden wide extremes in temperature make it especially important to provide for expansion and contraction in our concrete work.

"Every engineer strives for three things in road building: durability, smoothness, and neat appearance. The use of uniform, high compression concrete, properly finished upon a good subgrade, is imperative, but expansion joints, properly designed and installed, must also be used at frequent intervals.

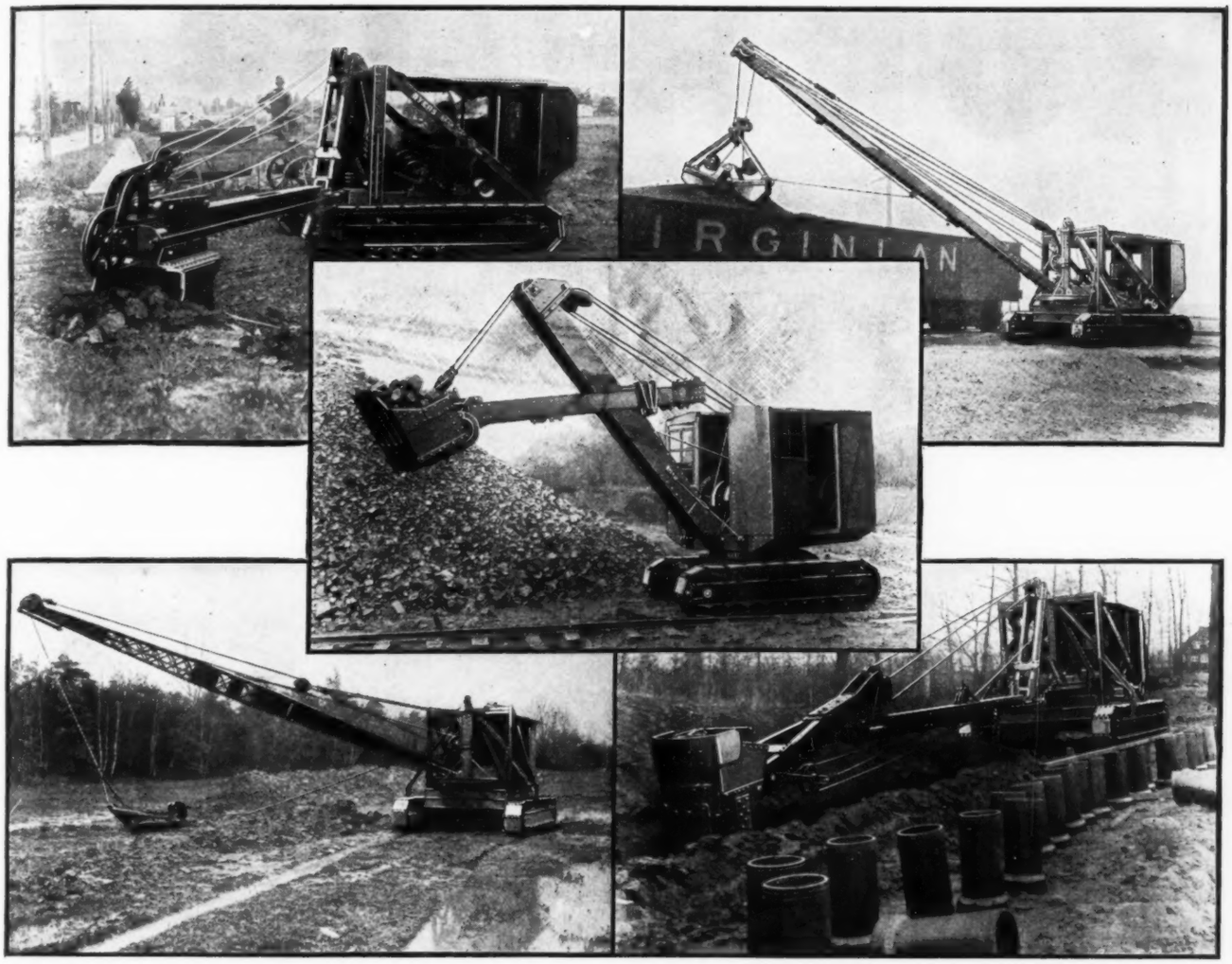
"The use of a premoulded, yielding expansion joint, supplemented with the so-called 'skirt,' adds appreciably to the life and appearance of our Arizona roads. Such provision must be made eventually, and if the joints have to be cut into the concrete after the road is finished, unnecessary delays, labor, and expense are inevitable. Arizona contractors, once hesitant about the use of expansion joints, now appreciate the importance of installing them when the road is first constructed."

Concrete roads in Arizona, as in many other states, are lastingly protected against expansion and contraction stress by Carey Elastite Expansion Joints. The wide use of this material, in view of Arizona's rigid requirements, is a splendid tribute to its efficient service.

THE PHILIP CAREY CO.
Lockland, Cincinnati, Ohio

Maranette-Hot Springs Highway, Maricopa County, Arizona. 18 feet wide, 6-inch center thickness, and 9 inches thick at edges—the "Maricopa" type of construction.

Carey Elastite
REG U.S. PAT. OFF.
TRADE MARK REG'D U.S. PATENT OFFICE
EXPANSION JOINT



Of Course You are Considering a Half Yard Machine

COMMON sense and cold figures demand consideration of a half yard machine for a majority of jobs. And a majority of buyers weighing the facts and buying on facts rather than on enthusiasm or promises, will probably choose a Bear Cat, for these reasons:

1. The Bear Cat has proved itself for four years on all kinds of work for hundreds of contractors.

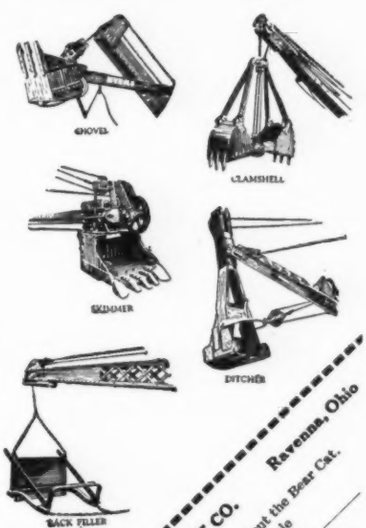
2. Byers established the ½ yard "all-purpose one-man crane" as a successful proposition and has concentrated for several years on this one machine, constantly improving and strengthening it.

3. The Bear Cat handles five interchangeable attachments with complete success.

4. The Bear Cat is of quality construction in every respect, and yet its price is comparatively low, due to large production.

5. In line with Byers policy of "the right tool in the right place," the Bear Cat is furnished in both half and full revolving models.

6. In performance, in dependability, in low cost of operation, the Bear Cat gives real satisfaction.



Let us tell you more about this All Purpose One Man Crane-Shovel

BYERS MACHINE COMPANY, Ravenna, Ohio

Builders also of Byers Truckrane — *Sales and Service Throughout the Country*

BYERS MACHINE CO. Ravenna, Ohio

Gentlemen:— Please send me information about the Bear Cat.
☐ Half Circle ☐ Full Circle

Name _____

Address _____

Town _____ State _____

S.M. 8-27

BYERS BEAR CAT

HALF CIRCLE AND FULL CIRCLE SWING

KOEHRING

SPEED!

—SPEED built into the Koehring as never before in a crane!

—Seems to have a downright eagerness to hustle the job, just as some good cars at a touch of the controls seem to read your mind and leap to the job!

Finger-tip control! Sounds like an advertising slogan, doesn't it? But it's *real,* a *work day actuality!* And it's accomplished in a simple way — not by mechanical complications—but by clutches with enough friction area so that they almost operate themselves.

And then — the whole machine is tuned up to speed operation! Speed is designed into every gear and detail! *Speed,* and smooth, responsive action!

It's the crane built for the contractor who demands more than average *Results!* It's the crane for record breakers, and Koehring Heavy Duty construction means it stands up to all you ask of it—gives you reliability and long service life!

Know the Koehring! Write for Bulletin Cr. 17

KOEHRING COMPANY MILWAUKEE WISCONSIN

PAVERS, MIXERS — GASOLINE SHOVELS, CRANES AND DRAGLINES

Sales Offices and Service Warehouses in all principal cities

Foreign Dept., Room 1370, 50 Church St., N. Y.

Mexico, F. S. Lapum, Cinco de Mayo 21, Mexico, D. F.

Crane Capacities

Based on 66⅔% of Overturning Load

Quickly convertible to shovel or dragline.

No. 301—10 Tons at 12' Radius. When used with clamshell bucket loaded with dry sand or gravel:

1 Yd. Bucket (weighing empty 3,450 lbs.) at 28' Radius, 40' Boom;
¾ Yd. Bucket (weighing empty 2,600 lbs.) at 34' Radius, 45' Boom;
½ Yd. Bucket (weighing empty 2,050 lbs.) at 41' Radius, 50' Boom.

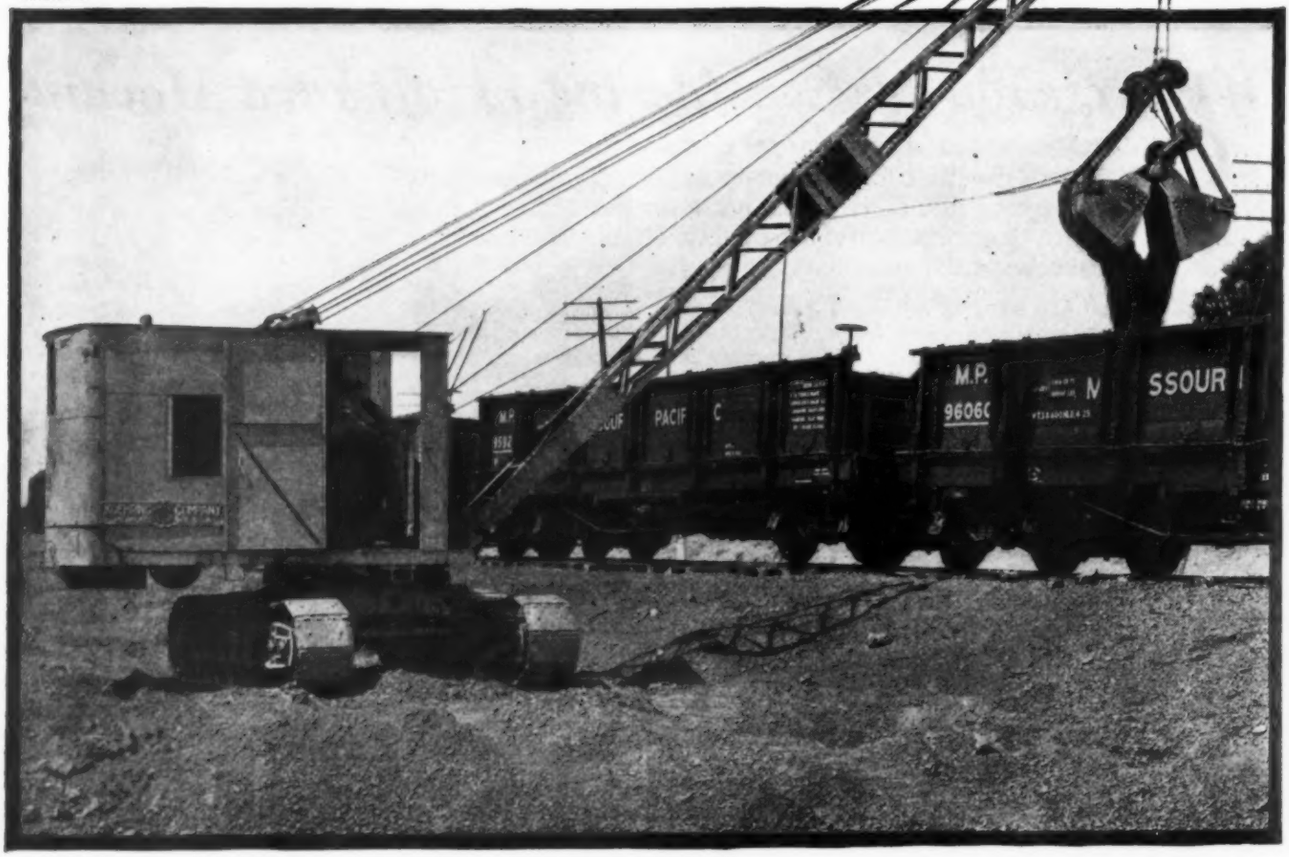
Wisconsin four cylinder gasoline engine, 5¼" x 6½", 1,000 R. P. M.

No. 501—17 Tons at 12' Radius. When used with clamshell bucket loaded with dry sand or gravel:

1½ Yd. Bucket (weighing empty 4,800 lbs.) at 31' Radius, 45' Boom;
1¼ Yd. Bucket (weighing empty 3,950 lbs.) at 36' Radius, 45' Boom;
1 Yd. bucket (weighing empty 3,500 lbs.) at 41' Radius, 50' Boom;
¾ Yd. Bucket (weighing empty 2,800 lbs.) at 48' Radius, 55' Boom.

Wisconsin four cylinder gasoline engine, 6" x 7", 925 R. P. M.

A-4002-1



fastest—by the watch!

MultiFoote proves it

THE Tibbetts Construction Co., laying the LaPorte Highway out of Houston, Texas, on April 10 laid 1144 lineal feet of Bates type concrete road 20 ft. wide and 6 inches thick. April 30 this was raised to 1322 lineal feet. On May 9 to 1392 and on May 14 to 1515 lineal feet. This is an average of 30.37 cubic yards an hour. The average daily output was far above the 600 feet that the county engineers figured the contractors should lay.

—*Steady Footage!*

In Cleveland, Ohio, laying the super-highway 36 feet wide on South Euclid, the Dorsey Construction Co. is putting in one half of the road at a time with a 26 ft. boom. Their MultiFoote 27E is laying 500 lineal feet of 11 inch concrete a day. Over 32 cu. yds. an hour even with the long boom.

—*Steady Footage!*

Since that time the Wesco Construction Co. of Chattanooga, Tenn., on a road job at Thomasville, Ga., using a MultiFoote 27E, laid 3832 sq. yds. of 4 inch concrete base in nine hours. This is 47.33 cu. yds. an hour or a batch every 77 seconds.

—*Steady Footage!*

These are but a few of the many examples that attest to MultiFoote steady footage—a few proofs of the MultiFoote speed that means money—the direct result of the high operating platform and the freedom from delay that comes with Foote design. *These are facts—not theory.*

The FOOTE COMPANY, Inc., *of Nunda, N. Y.*

World's largest exclusive builders of road pavers

FRANK E. HALL
452 W. 42nd St., N. Y. City

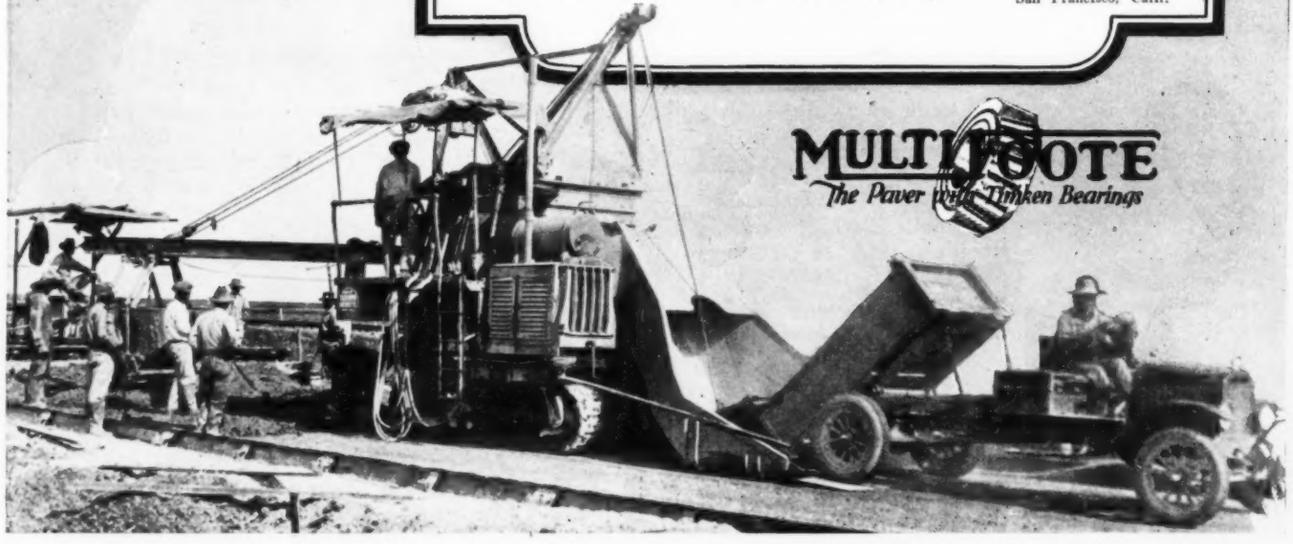
WILCOX BROS., Inc.
588 Chenango St.
Binghamton, N. Y.

E. J. McHARG & CO.
31 Crestmont Road
Binghamton, N. Y.

MULTIFOOTE SALES CO.
2811 W. Fulton St., Chicago

BURTON FRANKLIN
Volunteer Building
Chattanooga, Tenn.

EDW. R. BACON CO.
Folsom at 17th Street
San Francisco, Calif.



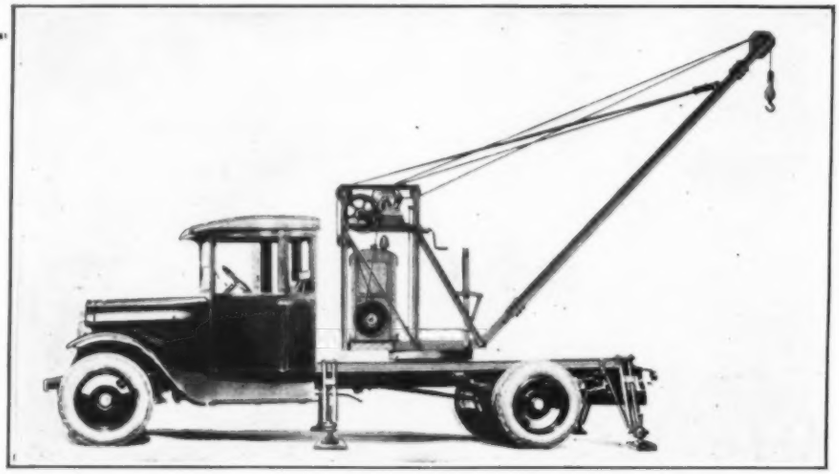
SMS-25Gray

The RIX TRUCK CRANE

One control for hoisting and lowering.

Full circle swing with single lever control.

For medium weight 2-2½-ton trucks.



Crane a self-contained unit easily removed from truck and used as yard derrick.

No holes drilled in frame of truck when mounting crane.

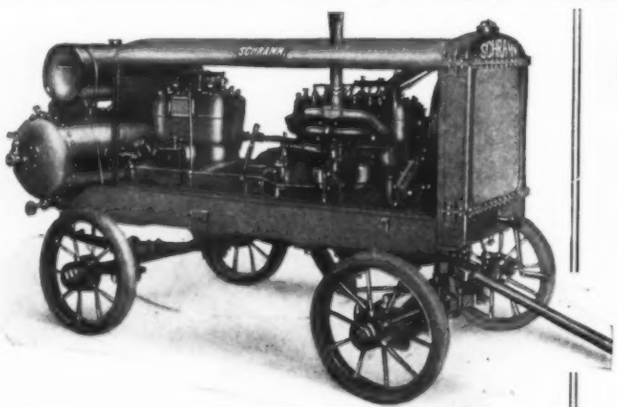
The RIX TRUCK CRANE is a special designed swinging boom crane of comparatively light but substantial construction to permit of mounting on medium weight or light trucks.

Outriggers used as stabilizers *as well as to hold up load while hoisting,* thus relieving truck frame of strain, and enabling users to make SUBSTANTIAL SAVINGS in TRUCK and CRANE investment.

Handles all hoisting up to and including two tons. A 4-cylinder governor controlled engine for swing and hoist power. Equipped with automatic load brake. Standard boom 15 ft.

If you are interested in a full-fledged YET LOW PRICED CRANE that will save you money in TRUCK INVESTMENT write us for full particulars and prices.

SQUIER-RIX COMPANY
373 Broadway, Milwaukee, Wisconsin
Rix Tractor Cranes, Rix Haulers and Trailers



Compressors—
for every contracting and engineering job—

We supply the field with portable compressors for every need, in many types. A big job! But judging from the demand, the repeat orders, and favorable comments from users, Schramm Compressors have made good in a big way. And no wonder.

Powerful Buda engines, each equipped with clutch, governor (a *real* feature) and gas strainer (keeps dirt *outside*), stand up under the worst abuse.

The simple, large capacity compressors keep your tools supplied with full pressure—economically.

Mounting—Cast Steel Frame.

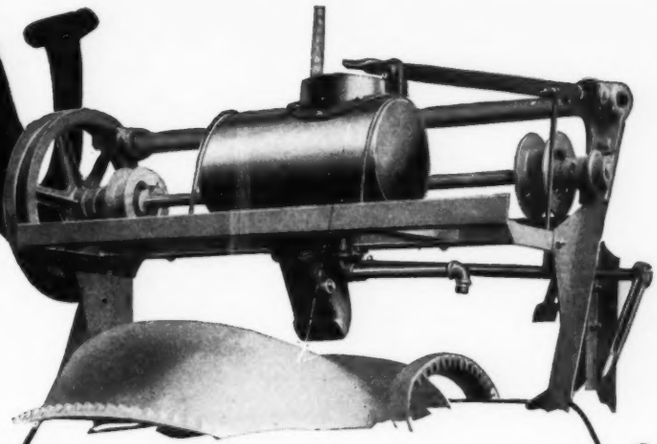
Let's coöperate and talk it over.

Sizes—60, 120, 180 and 240 Cu. Ft. Gas, electric or belt drive. Truck, trailer, skid or tractor mounted.

Get the catalog.

Schramm Inc., Manufacturers
West Chester, Penna.
Offices and Representatives in Principal Cities

NOW



The WONDERQUICK

Accurate Measuring Easy Operating Fast Discharging Water Tank

THE new Wonder Tank solves the problem of water requirements for concrete mixing. It accurately measures and puts the proper amount of water in the mixing drum when you need it and in the shortest possible time. It's simple to operate. No complicated mechanism—no three-way valve—no tilting or moving of the tank.

The new Wonder Tank is fast—it's simple—it's positive in action.

This is an exclusive Wonder feature—another Wonder time saver to speed up your work and increase your daily output.

The Wonder catalog fully pictures and describes the new Wonder Tank as well as many other profit earning features.

Send for your copy today! Also ask for new low prices.

CONSTRUCTION MACHINERY CO.

Nationally Distributed From Convenient Points

403 Vinton St., Waterloo, Ia.

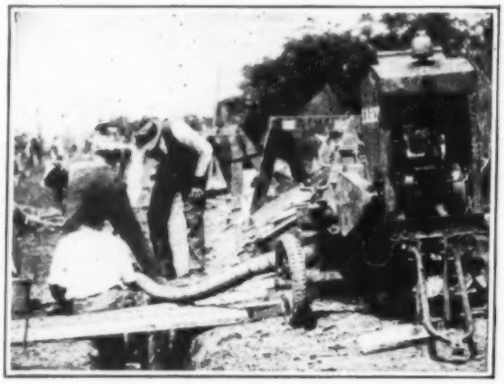
WONDER

The Original Single Opening Tilting Mixer

"We have now discarded our other pumps and are standardizing on the

HUMDINGER"

J. H. GEST,
G. M. GEST, CO.



THE Humdinger pictured was put on the job when water and quicksand were encountered 8 in. below the surface. The Gest superintendent reported it was "necessary to use pumps throughout the entire job and they were put to extreme test."

On the strength of this unit's performance the Gest organization has STANDARDIZED WITH HUMDINGER PUMPS. It was the logical, money saving, result producing thing to do.

A HUMDINGER WILL DISCHARGE ANYTHING THAT ENTERS THE SUCTION END.

HUMDINGER FEATURES

1. Rubber ball valves that eliminate clogging, seat tighter allowing maximum capacity and greater suction lifts.
2. Closed, threaded outlets allowing pumps to discharge thru hose under pressure. No more troughs to build.
3. Driving jack totally enclosed and running in a bath of oil. Longer wear, less attention.
4. All steel truck with wrought steel wheels.

WRITE for the Humdinger Bulletins in which you are interested. Diaphragm Force Pumps, Bulletin No. 103; Open Discharge Diaphragm Pumps, Bulletin No. 104; Power Force Pumps, Bulletin No. 105; Centrifugal Pumps, Bulletin 107. The attached coupon is for your convenience.

Ralph B. Carter Co.
126 Chambers St., New York, N. Y.
Hackensack, N. J.

Ralph B. Carter Co.
126 Chembers St., New York, N. Y.

Gentlemen:

Please send me Bulletin No. .....

From .....

Street .....

City and State .....

Name .....

SMITH
THE T. L. SMITH CO. MILWAUKEE U.S.A.

MORTAR MIXERS

2½-S SMITH—*Mixing Brick Mortar*

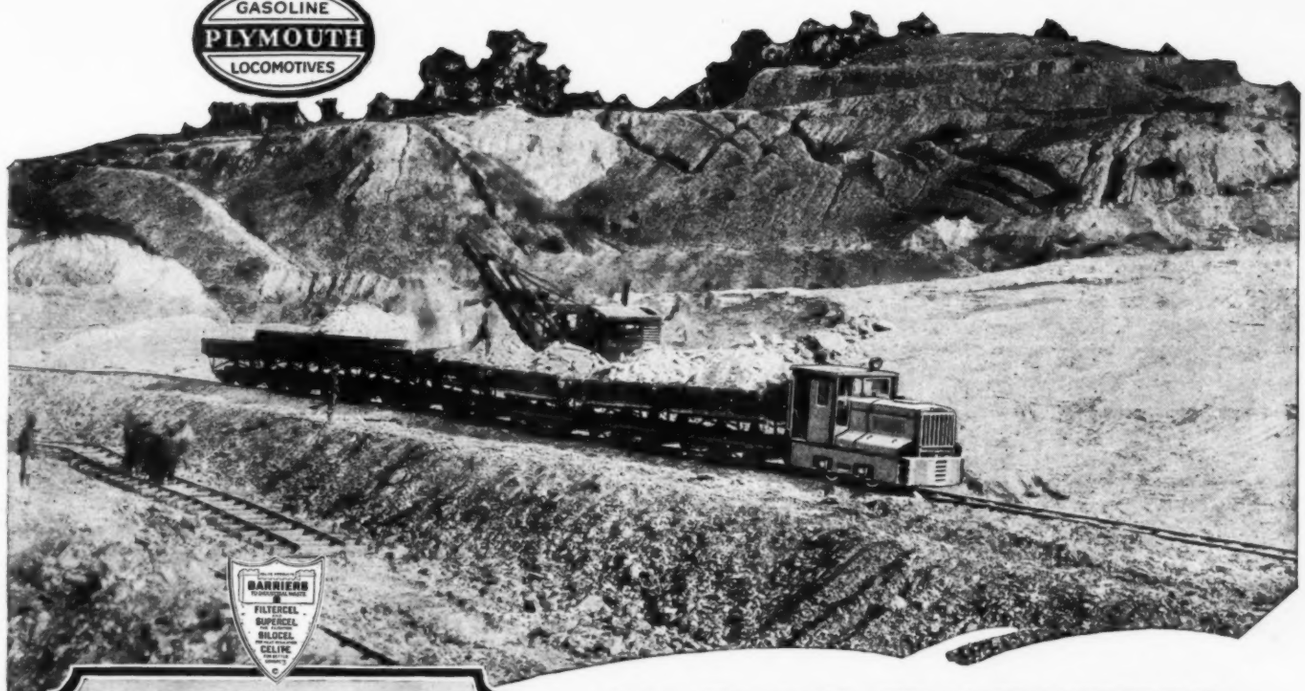
THEIR speed, ruggedness and consistent evenness of mix, make Smith Tilting Mixers unusually profitable on mortar work. The end-to-center action of the famous Smith drum and its eight-second discharge are two factors that keep costs down and materially help in securing the profit expected from each bid.

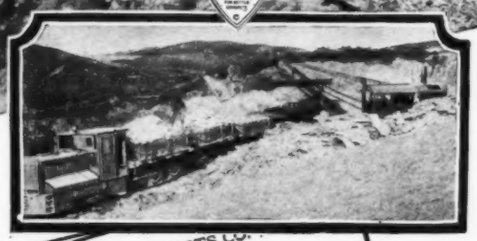
Catalog 526 covers fully the Smith Line of Tilting Mixers from 2½ to 112 cu. ft. per batch, Smith Non-Tilting Mixers in 5, 7, 10, 14, 21 and 28 cu.ft. sizes and Smith Paver 27-E. Write for it— today.

THE T. L. SMITH COMPANY
1084 32nd Street, Milwaukee, Wis.
Sales Offices and Service Stations in All Principal Cities.

Fast Dependable

GASOLINE
PLYMOUTH
LOCOMOTIVES





CELITE PRODUCTS CO.
White Hills, Cal.,
March 16, 1927

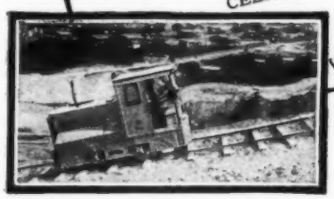
Collins Kay Machinery Co.
Los Angeles, California

Gentlemen:

Referring to the eight Plymouth locomotives which we have purchased from your firm, these have given us good satisfaction from the standpoint of reliability of operation and excellence of service by your firm and the factory.

As you know, we have some difficult operations here—one of which is well illustrated by the attached photo showing one of these locomotives going up a 25% grade under its own power, to reach an operation on the top of one of our hills. I am sure this will be of interest to you.

Very truly yours,
CELITE PRODUCTS CO.
Works Manager



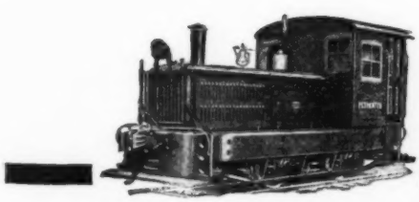
8 PLYMOUTHS
USED BY CELITE PRODUCTS CO. AT WHITE HILLS, CALIFORNIA

THESE eight Gasoline Locomotives were purchased from our Los Angeles agents, Collins Kay Machinery Company. The letter reproduced here from Mr. James Reed, works manager of the White Hills plant is evidence of the proven stamina of the Plymouth.

A Plymouth gasoline locomotive is always "steamed-up" and ready to go for either a heavy drag or a quick shift. It goes at the turn of the switch—it will out-pull a steam locomotive of the same rating and haulage cost per ton per year with the Plymouth is the lowest on record.

If it's a Track Haulage Problem
There's a PLYMOUTH to Solve it

PLYMOUTH LOCOMOTIVE WORKS
The Fate-Root-Heath Company
PLYMOUTH, OHIO

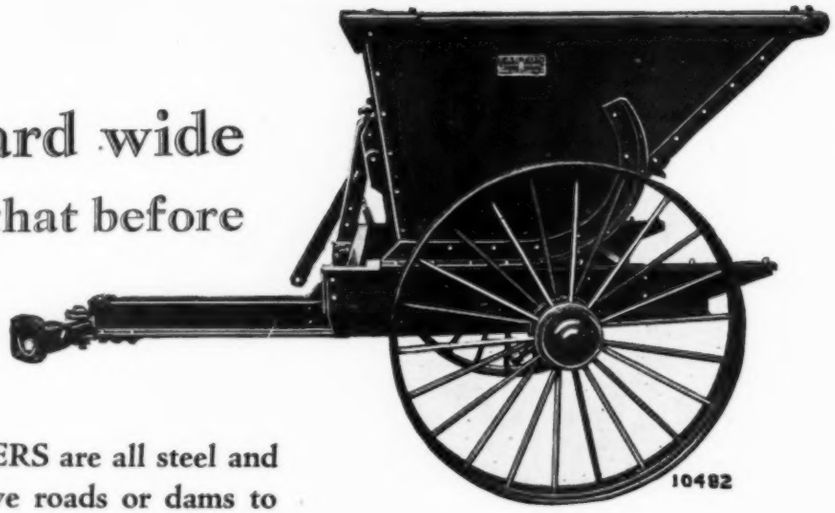


The 25 ton Plymouth Locomotive for Heavy Shifting and Hauling

PLYMOUTH
Gasoline Locomotives

All Wool and a Yard wide

You have heard that before



EASTON FORTY TRAILERS are all steel and *two* yards wide. If you have roads or dams to build, loose earth, shale or muck to move, they'll prove to you they are worthy of all that expression implies. Capacity 40 cu. ft. Operating methods entirely automatic. Sixty degree dumping angle.

EASTON FORTY TRAILER
$250.00 f.o.b. Easton

Easton Car and Construction Co.
Main Office and Works
Easton, Penna.

A Watson-Stillman Hydraulic Bender Bending Conduit Pipe for Subway Work. Note that but three men are needed in the crew.

DO YOU BEND MUCH PIPE?

If you do you need a Watson-Stillman Hydraulic Pipe Bender

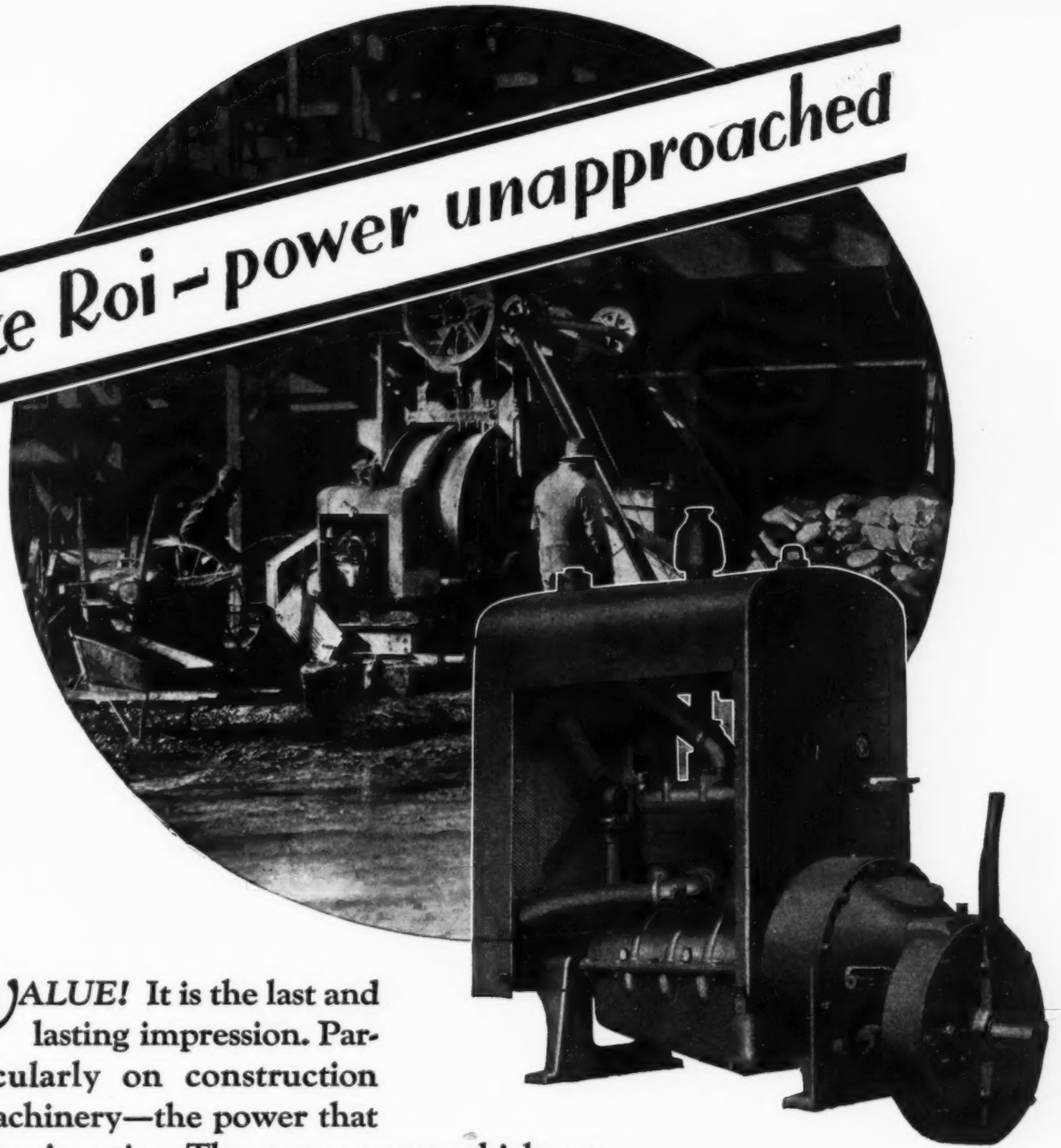
The illustrations show one of our hydraulic pipe benders designed for bending pipe of various sizes. These machines are not only rapid and economical of labor, but the bends are made uniform and without danger of buckling or crushing.

We build pipe benders in a variety of types and sizes as well as a full line of Hydraulic Machinery, including jacks, pumps, accumulators, presses, shears, etc.

Write for catalogs.

THE WATSON-STILLMAN CO.
1014 Evening Post Bldg., New York City
Chicago, 549 W. Washington Blvd.
Cleveland, Auditorium Garage Bldg.
Philadelphia, Widener Bldg.
Detroit, 7752 Duboise St.

Le Roi—power unapproached



VALUE! It is the last and lasting impression. Particularly on construction machinery—the power that gives it *action.* The power upon which contractors depend for profit.... To distinguish itself as a leader the Le Roi Engine boasts of a record of unbelievably low maintenance cost. It is preferred because it performs — the popular choice of most contractors.

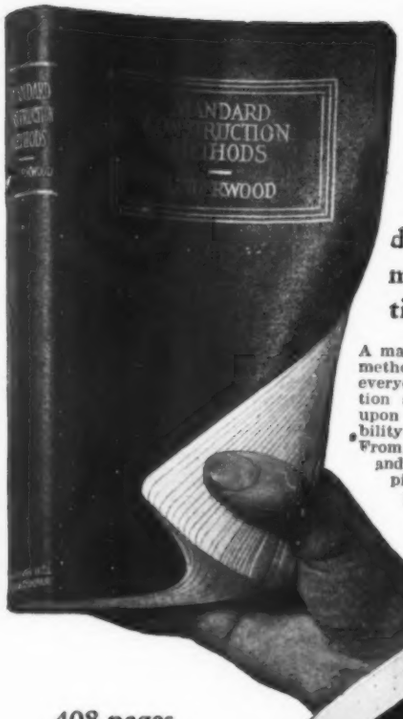
Le Roi's operating costs are the lowest per day and per year.

ENGINE BUILDERS *only!*

Le Roi Company, *Milwaukee, Wis.*

LE ROI ENGINES

3 *to* 160 HORSE POWER



JUST OUT!

A practical working book for the man who must get things done right and done quickly in modern construction work.

A manual of actual construction methods; methods that are *used* everyday by practical construction superintendents and others upon whom rests the responsibility of getting things done. From first steps in organizing and preparing equipment, to pipework and painting; from pile driving to scaffolding, this new book covers everything in satisfying detail.

408 pages
6x9
327 illustrations
Flexible
Keratol
$5.00

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Everything in this book is practical, workable, and has been demonstrated over and over again in the field. It is a book no construction man will want to be without.

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THE
LOWELL
Reversible Ratchet Wrench
offers
TWO RUGGED PATTERNS
for
HEAVY DUTY SERVICE

No. 12345

Length of handle 4 ft. to 6 ft. as desired. Sizes of openings in gears, 1½ in., 1⅝ in., 1¾ in., 1⅞ in., 2 in., 2¼ in., 2⅜ in., 2½ in. sq. Weight 50 lbs.

Also carried in stock with sockets (instead of gears) in the following standard sizes:—

Hexagon { 3⅛, 3½, 3⅞, 4¼, 4⅝, 5 } Square { 3⅛, 3½, 3⅞, 4¼, 4⅝, 5 }

SPECIALS MADE TO ORDER

These wrenches will meet your requirements when you want such a tool for hard exacting service.

State your problem and we will offer our recommendations as to how it can be handled with a

Lowell Reversible Ratchet Wrench

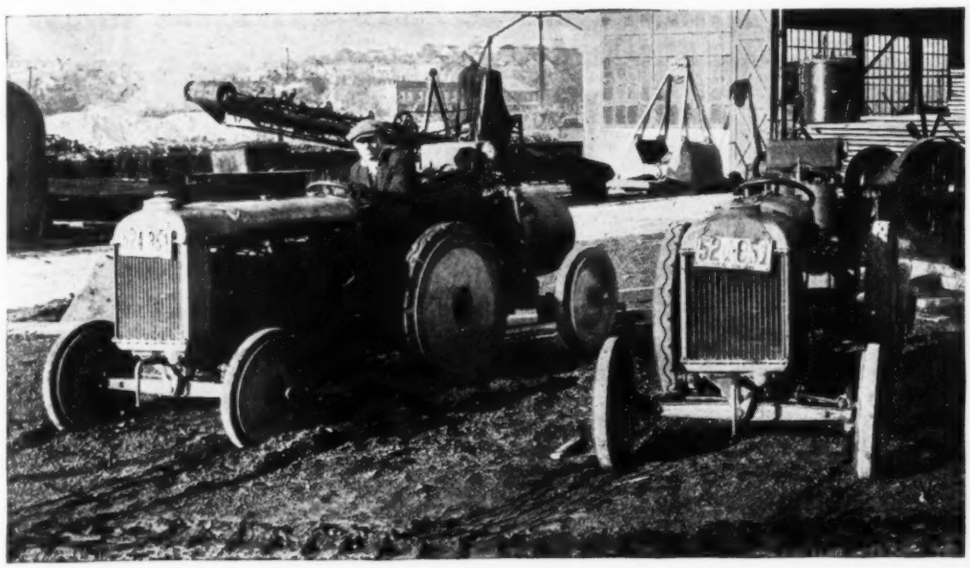
No. 123456

Length of handle 3 ft. to 5 ft. as desired. Sizes of openings in gears 1⅛ in., 1¼ in., 1⅜ in., 1½ in., 1⅝ in., 1¾ in. sq. Weight 30 lbs.

LOWELL
WRENCH CO.
54 Commercial St.
WORCESTER, MASS., U. S. A.

WHY WAIT

Ask for Catalog M
and Get the Complete Story
NOW



NAME A JOB
where you would fail to
SAVE ON THE COST OF AIR
by standardizing on Curtis Portable Compressor

Contractors who own both large and small portable compressors find that the Curtis outfit is more universally useful, and is therefore kept busy a greater part of the time, than any other type they have ever employed.

While you can economically split up compressed air work among several Curtis units, you can not of course split up a single large outfit after the original job is over; nor can a large outfit be used economically to handle small jobs.

The Curtis Portable Compressor is not a one-job machine. It has shown its ability to meet demands made upon it for a *variety* of service, year after year.

Portability aside, and low price aside, it is the most profitable compressor equipment to own because it delivers air to the tools at the lowest cost under practically all circumstances.

This company is 73 years old and for 30 years has specialized on pneumatic engineering and high grade compressor manufacturing. It offers this unit as the one on which you can afford to *standardize* to the exclusion of other types!

Investigation will show you that your next equipment should be a Curtis Portable Compressor, powered and propelled by Fordson tractor.

List Price,
Curtis Unit Only
$900
SUBJECT TO DISCOUNT
(STEEL TIRED)

One "Unit" Acts as Complete "Line" for Dealers

Scores of dealers as well as contractors have responded to these advertisements. Dealers are particularly interested in the fact that the adaptability of Curtis Portable Compressor outfits to advantageously answer the purposes of the usual "line" of other types can be shown by having only one Curtis "unit" on the floor.

With an unusually small investment, you can supply the compressor needs of any contractor for practically every class of work. The low price compared with any other outfit that will do the same work is a powerful selling leverage. Once purchased, the Curtis outfit proves so satisfactory that repeat business is practically certain, when additional capacity is required.

MAIL COUPON TODAY

Curtis Pneumatic Machinery Company
1995 Kienlen Ave., St. Louis
Branch Office: 5518N Hudson Terminal, New York

Gentlemen:
Please send at once full information about the Curtis Portable Compressor, powered and propelled by Fordson tractor. I prefer to deal through

(dealer).....

Name.....

Address.....

Advise kind of work in margin or by letter.

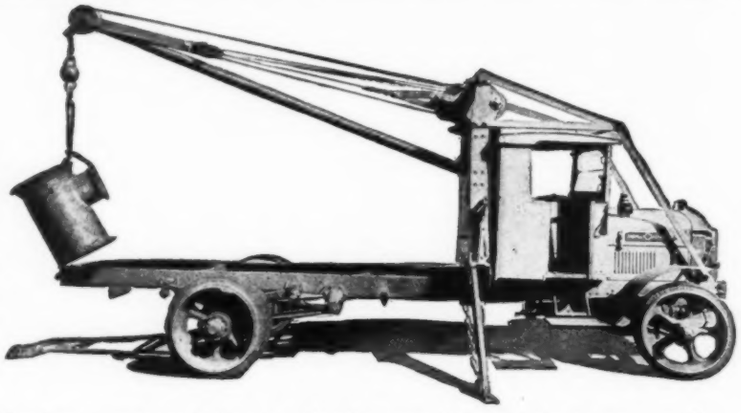
CURTIS COMPRESSOR
PORTABLE

Both powered and propelled by Fordson Tractor

CURTIS PNEUMATIC MACHINERY COMPANY, ST. LOUIS, U.S.A.

AUTO TRUCK DERRICK

HOISTS--LOADS--DIGS



CONVERT your truck into a TIME and LABOR saver with this derrick. It will serve many purposes if mounted on a chassis of sufficient tonnage.

With HOOK or CHAINS, it lifts pipes, girders and other solid objects. With LAZY TONGS it handles barrels, bales, boxes, crates, etc. With CLAM SHELL or ORANGE PEEL bucket it loads stone, gravel, sand, coal and other soft or loose material.

ONE OPERATOR standing on truck has absolute control over the load and its placement.

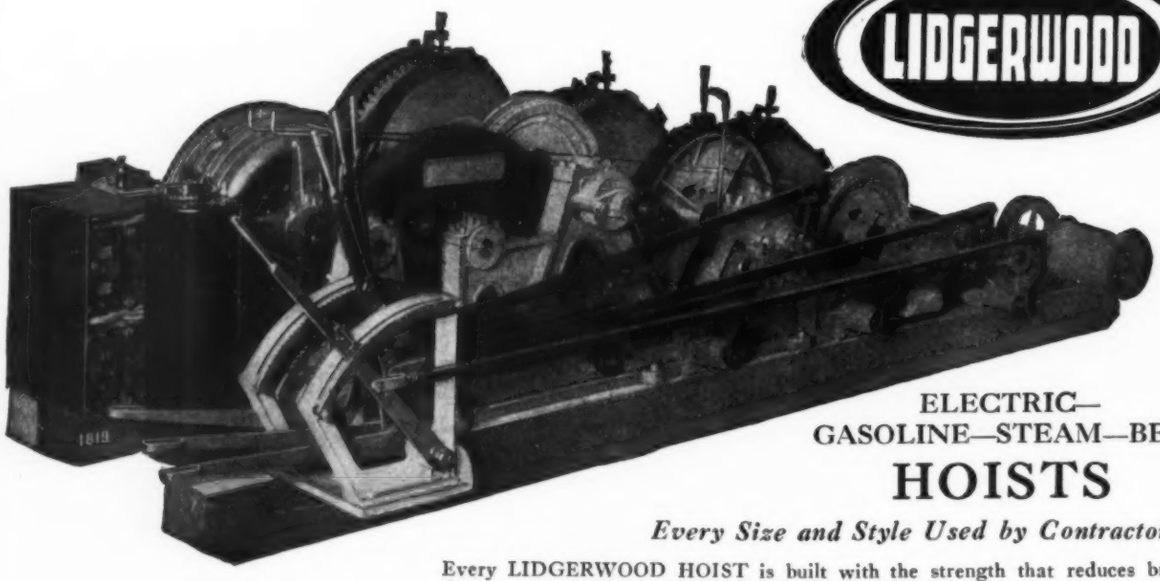
The construction of this derrick is such that it can be knocked down, packed compactly and shipped anywhere. Derrick has large factor of safety over specified capacity. Protection from breakage due to overload is insured by patented slipping clutch set to lift slightly in excess of rated capacity.

Operation of clam or orange peel bucket is simple, any unskilled workman can operate this machine and it will also do the work of vertical hoists on trucks for raising and lowering body.

Prices and fuller details will be sent on request. Certain territory still available for first class Distributors. Correspondence invited.

ATIA CORPORATION, 150 Broadway, New York, U.S.A.

Also ATIA Ash and Garbage Removal Bodies



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GASOLINE—STEAM—BELT

HOISTS

Every Size and Style Used by Contractors

Every LIDGERWOOD HOIST is built with the strength that reduces breakdowns to a minimum, and reduces time lost for repairs.

They have SPEED that cuts out the waiting time of labor

THIS MAKES THEM THE CHEAPEST HOISTS TO BUY AND USE

Lidgerwood Manufacturing Company, 96 Liberty Street, New York

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FOREIGN OFFICES: London, England; Sao Paulo, Brazil; Canadian, Allis-Chalmers, Ltd., Toronto, Canada.

Needed for the past 30 years

A portable saw like this —

one that is really safe—has been needed for the past 30 years

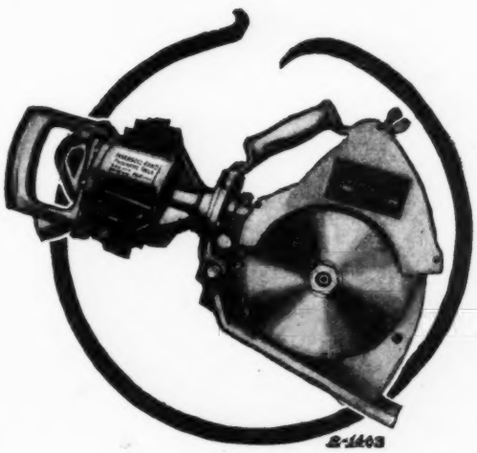
It meets all Safety-First requirements

THIS portable air saw is the only one ever made with a Safety Guard which positively protects the operator from injury.

This new high-speed sawing tool, which is operated by compressed air, will do more work than ten men with ordinary hand saws. It is portable and can be taken anywhere on the job where sawing is to be done.

The Ingersoll-Rand Safety-First Air Saw is made in three sizes to take blades of 6″, 8″, and 12″ diameters. These will cut to depths of 1½″, 2½″, and 4⅛″ respectively.

Let us send you complete information.



Size B-8 Safety-First Air Saw. Cuts to a depth of 2½″. Weighs only twenty pounds complete.

INGERSOLL-RAND COMPANY · 11 BROADWAY · NEW YORK CITY

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INDEPENDENT

Reinforced Concrete Pipe

Ready for Your Sewer Job

When the specifications call for INDEPENDENT Reinforced Concrete Pipe, you can be sure that the pipe will be delivered along the line of work—on time—ready to lay. And you can be sure of getting pipe of highest quality, built strictly to specifications by concrete pipe specialists.

Prompt delivery is only one of several "INDEPENDENT" features that mean a smooth-running, profitable sewer job for the contractor. Put the pipe requirements of your next concrete sewer job up to us. We will send a quotation that will interest you. Write or wire us.

INDEPENDENT CONCRETE PIPE CO.
209 North West Street, Indianapolis, Ind.
Sales Agencies in Principal Cities

200 hours — one diaphragm

In a recent test a Novo Diaphragm Pump pumped water *steadily* for 200 hours before the "Tripl-Life" Diaphragm even weakened, the ordinary diaphragm is good for only about 50 hours. That's one reason why the Novo Diaphragm Pump handles any capacity — from 50 to 10,000 g. p. h. — at a profit. *Write today for complete details.*

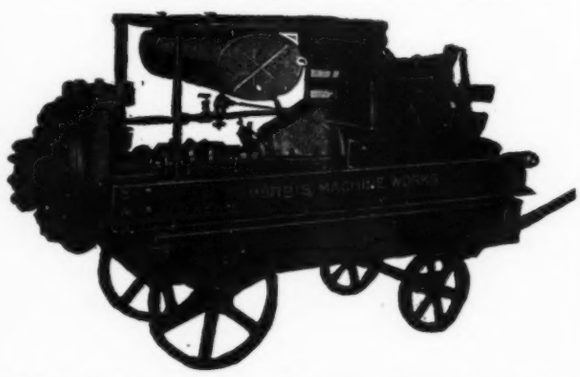
NOVO ENGINE COMPANY, 214 Porter St., LANSING, MICH.

NOVO

THE NEW DIAPHRAGM PUMP

Clarence E. Bement, Vice-Pres. & Gen. Mgr.

To make your unwatering and water supply problems easier!

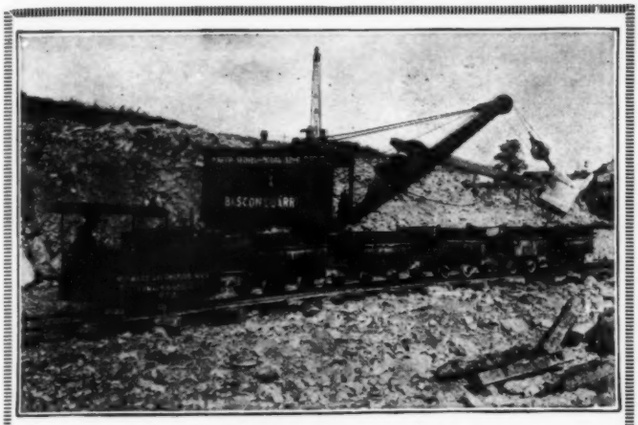


THIS Morris Portable All-Purpose Pump handles anything from clear water to floating dirt, sand and gravel, delivers 300 to 600 gals. per min., can be used for heads up to 50 ft., and is easy to cart from one job to another. For general water supply, unwatering excavations, sumps, etc., it can't be beat.

Write for literature about this and other sizes of Morris Pumps

MORRIS MACHINE WORKS, Baldwinsville, N.Y.

MORRIS
CENTRIFUGAL PUMPS



When on Rock Excavation
and the Work Goes Slow

MID-WEST
Gasoline Locomotives

will hurry the stuff away when you get it on the cars. They will keep on doing it, too, all day long and all through the job.

Because

They are built for that kind of service and not to make you wonder how you will move the stuff tomorrow.

They are not built "to just get by" but to leave fond memories when the job is done.

Built in sizes from 3 to 25 tons. Let us tell you more about them.

Mid-West Locomotive Works
Cincinnati, Ohio

Do the job with Metaforms save time and labor—cut costs

METAL FORMS CORPORATION
Milwaukee, Wis.

Ask another one!

Union Hammers answer every pile driving question.

How many Union Hammers are there? Nine different sizes.

Do they drive and pull? Yes.

Do they damage the pile heads? No.

Why? Because of the special base equipment—bases to drive each kind of piling, preventing injury to piles and insuring straight driving.

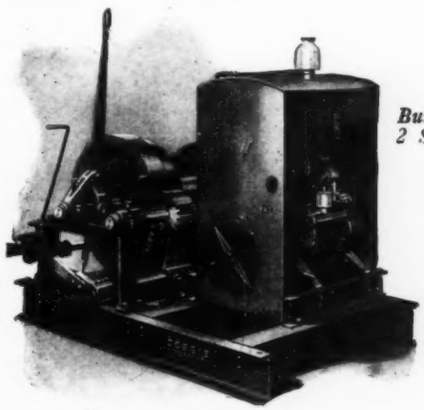
What do users think of them?

They express their thoughts in repeat orders.

Ask another one!

Union Iron Works
Hoboken, N. J.

Builders of Double Acting Pile Hammers Since 1906.



Built in 2 Sizes

We know your hoisting problems! . . . this hoist will help solve them

This is an eight horsepower unit that fits all your requirements for a rugged hoist for light work.

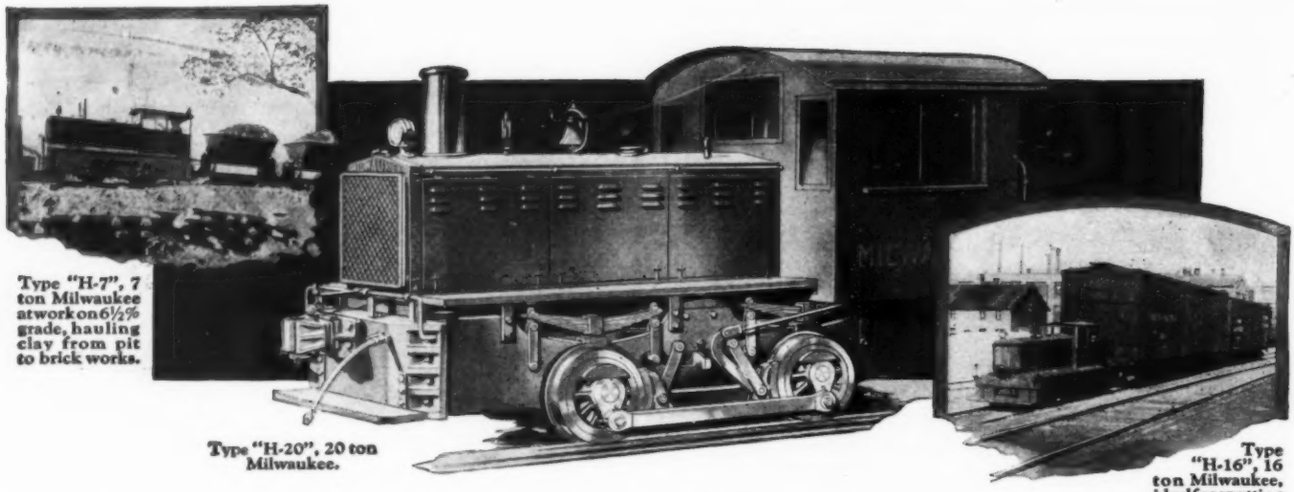
Equipped with a single friction drum fitted with foot brake, ratchet and pawl and is direct geared to a two-cylinder hopper-cooled engine. Complete in all details.

Built in 2 sizes: one with a speed twice that of the other and a single line lifting capacity one half that of the other.

DOBBIE FOUNDRY AND MACHINE CO.
Niagara Falls, N. Y.

DOBBIE EQUIPMENT

PICK UP CARTS — DERRICK FITTINGS
SULKY DERRICKS — WINCHES, ALL TYPES



Type "H-7", 7 ton Milwaukee at work on 6½% grade, hauling clay from pit to brick works.

Type "H-20", 20 ton Milwaukee.

Type "H-16", 16 ton Milwaukee, ideal for spotting and switching freight cars.

Where there's Big Work *to be done-*

BIG work requires *able equipment* — able to do the work that must be done, able to do it at a maximum saving of time and labor, able to do it on a scale in keeping with the size of the job, able to keep on doing it day after day, week after week, month after month, year after year!

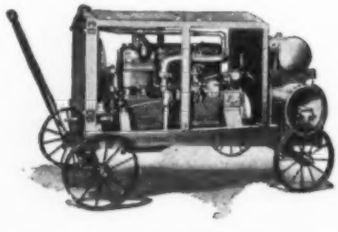
Twenty years of constant development, twenty years of gruelling service in all sorts of track haulage in many countries, are factors that have put stamina, flexibility, easy handling, dependability and economy into Milwaukee Gasoline Locomotives.

MILWAUKEE *Gasoline* Locomotives

MILWAUKEE LOCOMOTIVE MFG. CO.

Subsidiary of National Brake & Electric Company

MILWAUKEE, WISCONSIN



Get acquainted with National Air Compressors — the latest and greatest improvement made in gasoline engine driven portable units — the climax of thirty-one years' designing and engineering development. Engine and Compressor are a compact unit mounted on one crankcase and operated by one crankshaft.

SIZES: 110, 160, 240 and 330 Cubic Feet, standard mountings.

NATIONAL BRAKE & ELECTRIC CO.

Division of Westinghouse Air Brake Co.

MILWAUKEE, WIS.

National AIR COMPRESSORS

ANOTHER WESTINGHOUSE PRODUCT

Exclusive Territorial Sales Franchises Available.

MODERN MIRACLES

Moving the Mountains

To work in the mountains, a shovel must have mobility and the Speeder with its two Speeds on traction will negotiate any grade on which balance can be maintained. In Tulare County, California, a Speeder was unloaded and hauled 24 miles on a trailer. When grades became too steep the Speeder traveled the remaining 26 miles under its own power over roads where trucks could not follow.

The Speeder is Built for Unusual Jobs

Most any shovel will function under normal conditions but a Speeder is designed to stand up under the most severe operating conditions. Extra strength is built into the electrically welded structural base—lighter than a cast base but much stronger. And the positive cable crowd, independent of hoist, allows the full power of the engine to be used in crowding—a big factor on shallow cuts. Write for new catalog of Speeder excavating and material handling machines.

SPEEDER MACHINERY CORPORATION

GAS AND ELECTRIC MATERIAL HANDLING MACHINES

1209 So. 6th Street, W. Cedar Rapids, Iowa

"They have been fighting over the Cleveland since it was put in service," *Says a man in St. Louis—*

And why not? It's easy on the arms, less tiring on the men. Naturally they like it. They do more work.

The boss knows, too, that he is saving about 50% of the cost and 75% of the time breaking up pavements and hard roads. He registers big savings breaking up frozen ground, cutting manholes, enlarging trenches, or on any job he tackles.

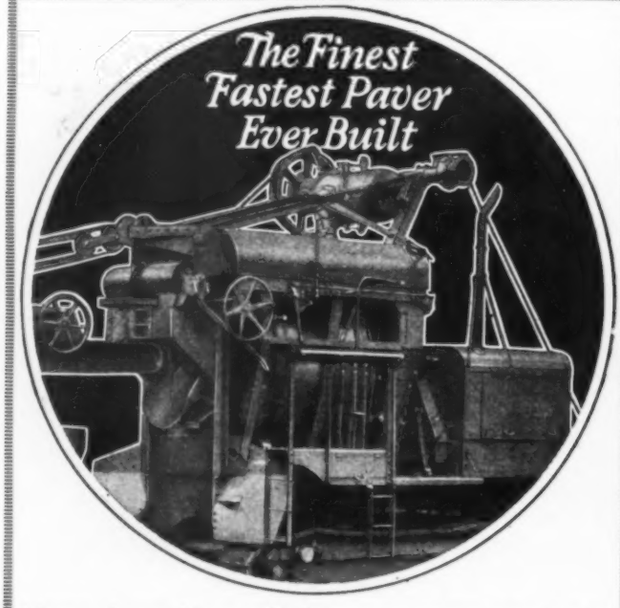
That's why we had to enlarge our facilities for building Cleveland C6 Paving Breakers.

Like our Paving Breakers Cleveland Rock Drills are sold all over the world. Illustration shows a Cleveland "Forty-Four" drilling hard whinstone in an English quarry.

The Cleveland Rock Drill Co.

3734 E. 78th Street,
Cleveland, Ohio

Branches and service stations in all principal cities.



Name those things which you want your paver to give you. Check the New Rex 27-E against them. On this buying basis you will buy the Rex—"The Finest, Fastest Paver ever Built." Ask for a catalogue on it.

CHAIN BELT COMPANY, 764 Park Street, Milwaukee

REX PAVERS

(Reg. U. S. Pat. Off.)

To Fill Any Form

The Stuebner Controllable Concrete Bucket with its patented device for regulating the width of discharge opening is extremely useful when you are filling narrow or inconveniently located forms.

It is a genuine time saving piece of equipment which pays for itself by stopping the waste of material. Write for information.

Turn-over and Bottom Dumping Buckets, Flat Cars, Push Carts, Steel Skips, End and Bottom Discharge Cars.

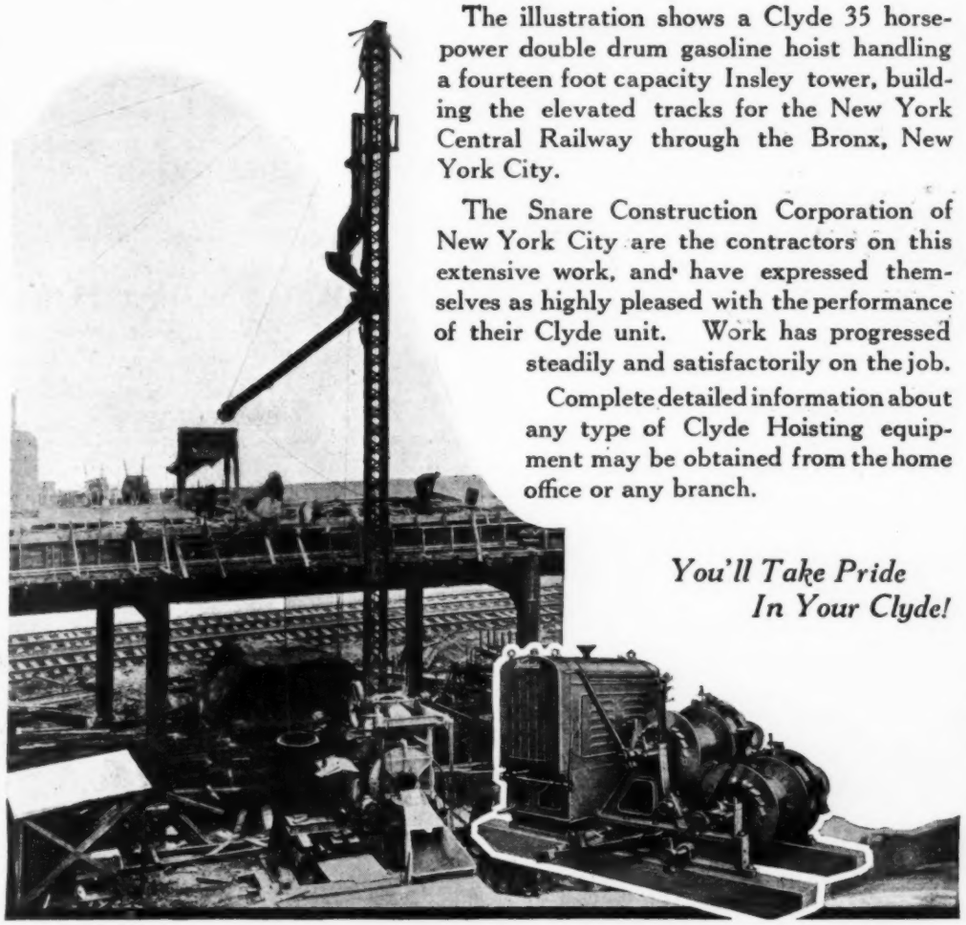
G. L. Stuebner Iron Works

Incorporated

West 12th St. and Vernon Blvd., Long Island City, N. Y.

CLYDE

HOISTS CLYDE DERRICKS



The illustration shows a Clyde 35 horsepower double drum gasoline hoist handling a fourteen foot capacity Insley tower, building the elevated tracks for the New York Central Railway through the Bronx, New York City.

The Snare Construction Corporation of New York City are the contractors on this extensive work, and have expressed themselves as highly pleased with the performance of their Clyde unit. Work has progressed steadily and satisfactorily on the job.

Complete detailed information about any type of Clyde Hoisting equipment may be obtained from the home office or any branch.

You'll Take Pride In Your Clyde!

CLYDE IRON WORKS SALES CO.

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SAN FRANCISCO: 739 MONADNOCK BLDG.

CLYDE TWO MARKS OF GUARANTEED QUALITY

SUCCESSFUL PERFORMANCE FOR A.G.C. A.F.

Buhl

AIR COMPRESSORS

Below is illustrated the BUHL Type C Portable Compressor—one of the many different types of this popular line. Moderate in original cost and low in upkeep.

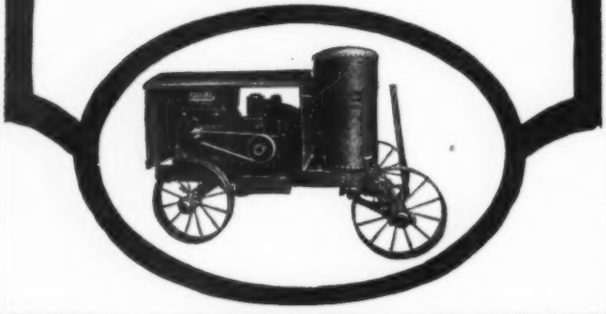
There are six sizes of portable air compressors in the BUHL line to choose from. For operating jack hammers, riveters, clay spades, concrete breakers, etc. The BUHL gives dependable air power at low cost—send for bulletins today.

Sales offices in principal cities

THE BUHL COMPANY

Manufacturers

37 W. Van Buren St., CHICAGO



THERE IS A Carbic LIGHT FOR EVERY NEED

No matter what the requirement might be—as long as there is a need for portable lighting—Carbic lights will "fill the bill."

Write for Catalog.

CARBIC MANUFACTURING CO.

Duluth, Minn. Main Office — New York City 141 Centre St.

STOCKS IN OVER 75 PRINCIPAL CITIES

This is Your Ticket

For a Free Tour of Over 50 Contracting Layouts

Here's a chance to make a free inspection tour of over 50 progressive contracting jobs, without going outside of your own door. Barber-Greene men have gathered information, pictures and layouts on interesting features of contracting work in every section of the country. The best of these have been collected in the 1927 edition of Loading Layouts. Sending this ticket brings your copy—send it today.

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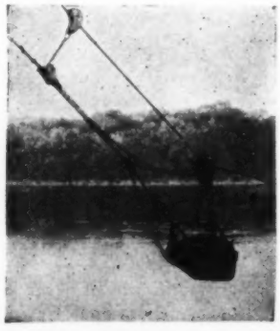
BARBER-GREENE CO. *Representatives* 530 W. Park Av., Aurora, Ill. *in Fifty Cities*

BARBER GREENE

Portable Belt Conveyors — Self Feeding Bucket Loaders

Coal Loaders . . . . . Automatic Ditch Diggers . . . . . Coal Feeders

"The Best Machine for Digging Sand and Gravel"—



Sauerman Cableway Bucket Taking Gravel Out of River

That is what S. G. MacTarnagham said after using a 13 cu.ft. Sauerman "Junior" Slackline Cableway for digging sand and gravel from the Alleghany River near Tionesta, Pa.

This Sauerman Cableway was a temporary set-up. The cable span extended 1,100 ft. across the river, but is was only necessary to operate the bucket over a part of this distance.

When you figure that a Sauerman Slackline Cableway *can dig, elevate* and *convey materials* and that the operating crew consists of one man only, you know why Mr. MacTarnagham claimed it to be the best machine for digging sand and gravel from river beds.

For a complete description, in pictures and in words, of what Sauerman Slackline Cableways can do, write for our booklet "Excavating For A Profit." A post card brings it.

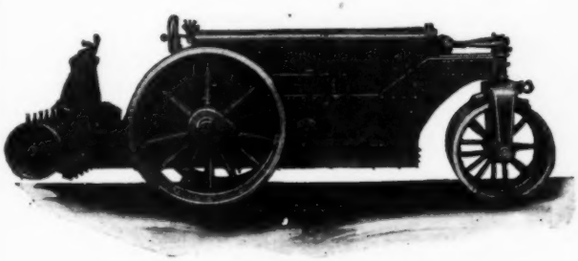
SAUERMAN BROS., Inc.

480 S. Clinton St., Chicago

BUFFALO-SPRINGFIELD ROLLERS

Steam and Motor Propelled

Built in all standard types and sizes



Standard 4-Cylinder Motor, 3-Wheel Roller equipped with Scarifier

Inquiries invited.

The Buffalo Springfield Roller Co.
Springfield, Ohio.

Digging 2 Yards of Dirt per Minute—All Day Long

Faster Swing—Faster Hoist—More Dirt

One 31-B loaded out as high as 42 truck loads per hour—at the rate of 5 dippers full to each truck—on a basement job.

The 31-B swings the loaded dipper faster—and hoists the loaded dipper to a dumping position faster.

Write for Bulletin C-311-2

Bucyrus Company, South Milwaukee, Wisconsin
50 Church Street, New York
134 South La Salle St., Chicago, Ill.

BUCYRUS

769-A

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---

Unretouched photo showing "L-5" Sinker on a 12-ft. hole. The blowing device cleans cuttings effectively

A New Sullivan Sinker

"L-5" 75 Lbs.

"L-5" fills the need for a medium weight, all around down-hole drill. It's a Rotator, of course, with all that that trade mark implies. "L-5" uses one-inch hollow steel for holes 12 to 18 feet deep. Try "L-5" for shaft sinking, light or heavy, open cut excavation in the quarry pit or on contract work.

SPEED—On measured runs in "Quincy granite" and at Barre, Vermont, "L-5" drills 10 to 12 inches per minute.

POWER—It's a fast cutting drill on shallow holes or deep ones, with lots of power and pep, furnished by the Sullivan positive spool valve.

TRUE HOLES AND CLEAN—Rear end rifle bar rotation insures strong, regular turning of the steel even in seamy or broken ground. A simple blowing device cleans holes most effectively.

SMOOTH RUNNING—Men work all day with the "L-5" and are not over weary, because "L-5" has end cylinder air cushions and runs smoothly and true.

STAYS ON THE JOB—Sullivan Drill experience and Sullivan Drill materials and manufacture insure low repair costs for the "L-5" medium sinker.

Try a couple of "L-5s" on your next shaft or open cut job. Your men will like them.

Ask for Bulletin 7281-Q.

SULLIVAN TRADE MARK
MACHINERY COMPANY
168 So. Michigan Ave., Chicago

Send for a copy of this Booklet. There's no obligation. It will give you a better picture of the nature of this service we are supplying contractors all over this country.

Feeding and Housing Men

A specialized Business—Backed by 20 years of successful experience

Where there is a Central Boarding and Housing Camp, there you will find satisfied labor. Railroads and contractors who have used this service for the past 20 years know the value of it and the savings that accrue from it—and the men do not object to the price they pay for it. It's a clean wholesome service. We also recruit labor from our free labor offices on short notice.

You get the work—we will feed and house your men, keep them on the job—and satisfied. Tell us your requirements and we will gladly figure with you.

CENTRAL Boarding & Supply Co.

Board of Trade Building, Kansas City, Mo.

42 S. Canal St., Chicago, Ill.
2 N. 9th St., St. Louis, Mo.

Principal Offices in other cities:

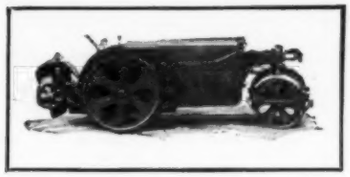
111 E. 14th St., Ft. Worth, Tex.
1101 Ross Ave., Dallas, Tex.

WILEY WHIRLEYS

HUBER

4-CYLINDER

MOTOR ROLLER



Dependable as steam!

Send for Bulletins!

The Huber Mfg. Co.
355 Center St.
Marion, Ohio

A Browning Truck Crane on construction work at the Cleveland Union Terminal

EASE of handling, flexibility and sturdy ruggedness combine to make Browning Truck and Crawler Cranes as reliable and profitable in the smaller gasoline crane class as the big Browning Locomotive Cranes.

THE BROWNING CRANE COMPANY
16226 Waterloo Rd.
CLEVELAND, OHIO, U. S. A.
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BROWNING
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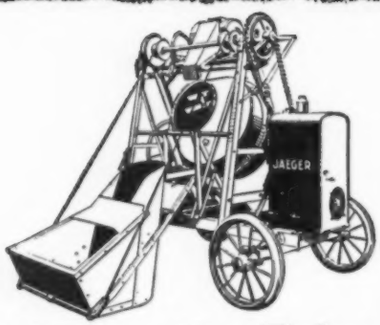
JAEGER MIXERS

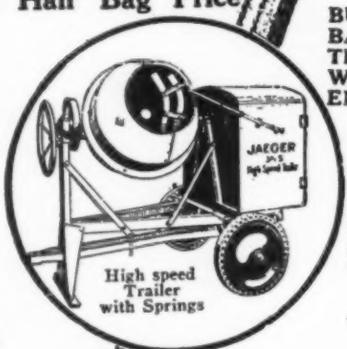


Ask About New Timken Roller Bearing One Bag Mixer at Half Bag Price

$166.25
Net Factory

BUYS HALF BAG TRAILER WITH ENGINE

The last word in mixers — with Skip Shaker — Accurate Measure Water Tank



Rubber tires or special high speed mixers can be had for a few dollars more.

JAEGER TILTING MIXERS
Built in Six Sizes
3, 3½, 5, 7, 10, 14 ft. capacity.
36 Models

JAEGER HEAVY DUTY NON TILT MIXER

100% Roller Bearings
All sizes 7-10-14-21 28 cu. ft.
Get Jaeger prices and catalogs

Mail This Slip for Catalog

THE JAEGER MACHINE CO.,
800 Dublin Ave., Columbus, O. Date.....

Please send catalog, prices and terms on:

☐Non-Tilt Mixers ☐Tilting Mixers ☐Plaster Mixers

Size wanted.....

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Address .....

City .....

State .....

$85 *BUYS*

THE BEST CONVERTIBLE INSTRUMENT MADE

"LOXO"

The price of the "LOXO" is so small that we cannot afford any trial offer—or inducements — or installment plan.

We sell cheap for cash and if you are not entirely satisfied with the instrument, send it back and your money will be cheerfully refunded.

The "LOXO" has many features found only in the larger instruments which cost many times more.

These special features all are a help to the operator and add to the efficiency and strength of the instrument.

No parts to change or add.

Accurate—Sturdy—Simple.

Learn to use it in 30 minutes. Instruction book included.

Send check or money order direct.

B. L. MAKEPEACE, Inc.
387 S. Washington St., BOSTON, MASS.
No obligation—write for our proposition on the "LOXO" Compound Level

"FULTON" POCKET TARGET

(PATENTED)

A handy and thoroughly practical Target to attach to Bob string.

Serves as pole or flag, and can be conveniently carried in the pocket.

Only 25 Cents each
(Per Dozen $2.50)

Thousands of these Targets have been sold under our "Money Back Guarantee."

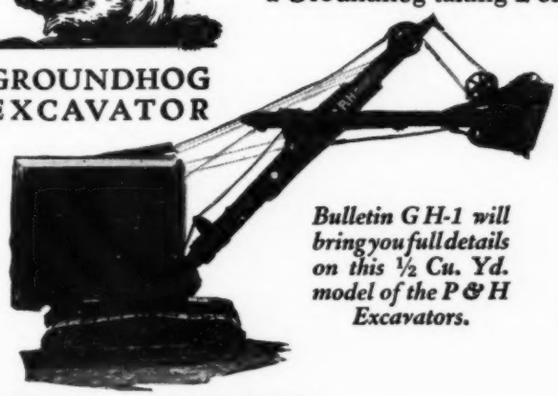
Write for a copy of "The Protrector" No. 51 containing full description.

KOLESCH & COMPANY
Established 1885
138 Fulton Street
New York, N. Y.

A Large Motor and the Strength to Back It Up

P&H

GROUNDHOG EXCAVATOR



WITH its 50 H.P. motor the P&H Groundhog has plenty of reserve power for any class of material which it is called upon to handle. You never see a Groundhog taking 2 or 3 bites to fill the dipper where one should be enough.

The Groundhog can stand the gaff, too—just as well as its big brothers in ¾, 1 and 1¼ yd. sizes. From the dipper teeth to Corduroy Shoes it is made of the highest grade materials—designed over-size. The patented P & H Crowd is there—the short tail swing [7′ 1½″]—and the fast swing speed of 5½ R. P. M. What's more, Groundhog can be readily changed into a Crane, Dragline or Pile Driver.

Bulletin G H-1 will bring you full details on this ½ Cu. Yd. model of the P & H Excavators.

HARNISCHFEGER CORPORATION

Established in 1884

3894 National Avenue, Milwaukee, Wisconsin

New York, Chicago, Charlotte, Pittsburgh, Los Angles, Atlanta, Philadelphia, Kansas City, Detroit, Portland, Seattle, Tampa, Birmingham, San Francisco, Dallas, Memphis, Jacksonville, Miami, Indianapolis, St. Louis, Minneapolis, Baltimore

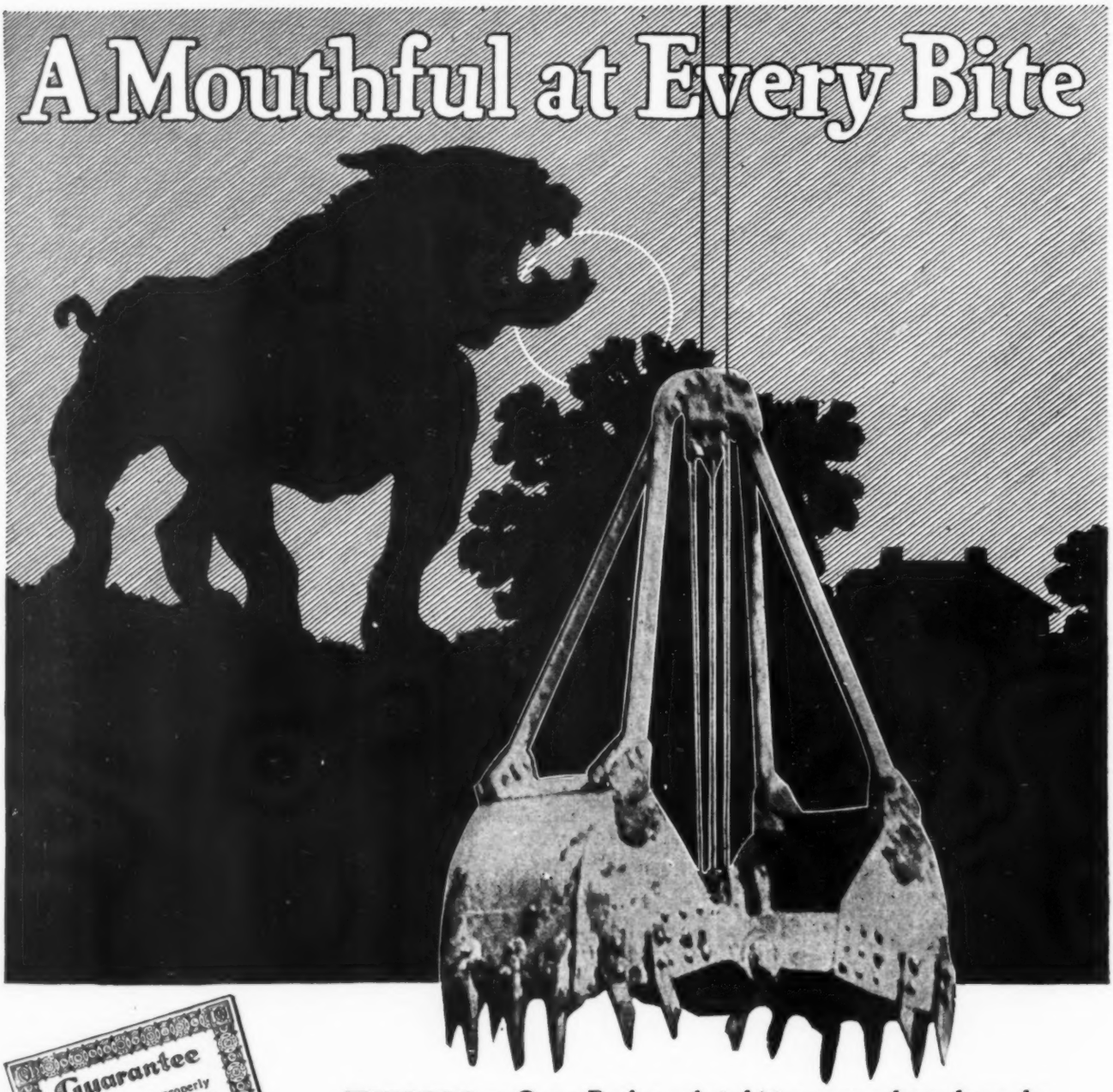
WAREHOUSES AND SERVICE STATIONS

Philadelphia, Memphis, Los Angeles, Jacksonville, Seattle, San Francisco

P&H GROUND HOG

ONE-HALF YARD GASOLINE EXCAVATOR

A Mouthful at Every Bite



Guarantee
Owen Buckets, properly installed and operated, are guaranteed to do a bigger day's work than any other bucket of the same weight and capacity—
—or—
Write your own guarantee!
THE OWEN BUCKET CO.

Only Owen Bucket users fully appreciate the above guarantee.

BULLDOG or Owen Bucket—their biting power depends on the same factors—penetrating teeth, stronger jaws, and *tremendous* pushing power behind that drives deep into the material.

When the closing cable is pulled in an Owen Type J Digger, the teeth or jaws can't let go. The weight is concentrated so that the bucket can't back away. That's why Owens get "A Mouthful at Every Bite."

Write for specific data and other information which will interest you.

THE OWEN BUCKET CO.
6023 BREAKWATER AVENUE • CLEVELAND, OHIO

OWEN CLAMSHELL BUCKETS INSURE A BIGGER DAYS WORK

Owen Buckets

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SPEEDILY PORTABLE — EASILY ACCESSIBLE

That's Humphryes Trailer Diaphragm Pump

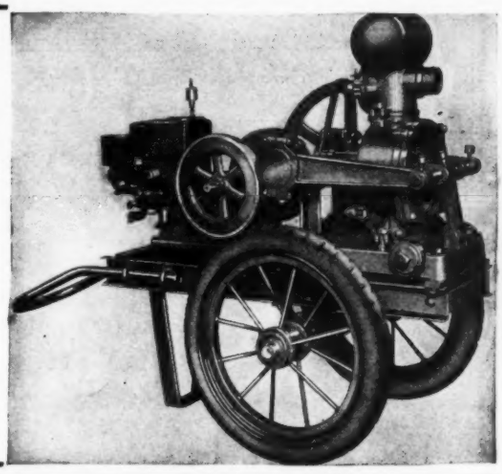
Mounted on two sturdy rubber tired steel wheels Humphryes Trailor Force Diaphragm Pump can be trailed speedily from job to job.

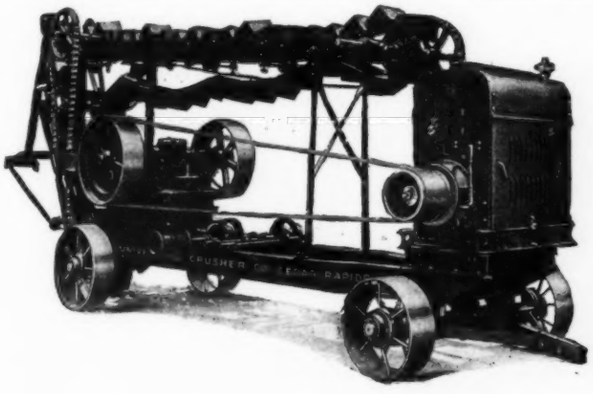
It is the most accessible unit made. Merely remove five brass nuts and a diaphragm can be replaced.

It is an ideal unit for public utilities, municipalities and contractors needing an easily portable pump.

Write for Bulletin 283-M

THE **HUMPHRYES** MFG. CO.
MANSFIELD, OHIO





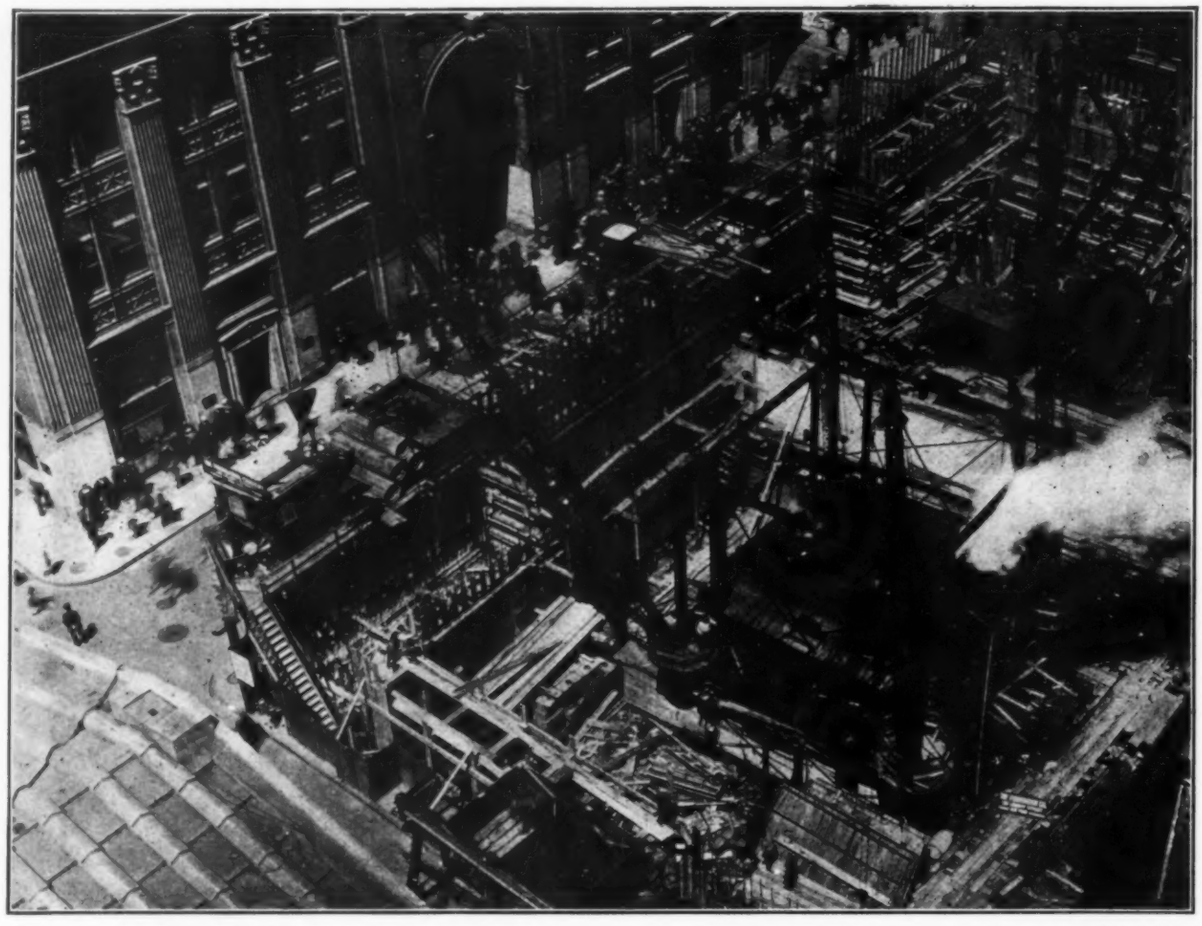
This is a popular type of UNIVERSAL CRUSHER

Illustration shows method of mounting crusher on steel roller bearing truck with steel folding elevator and four-cylinder gas engine. Very popular for road construction and maintenance and a favorite with contractors. Always ready for work with no delay setting up. Capacities 30 to 100 tons daily.

10 larger sizes, capacities to 450 tons daily.

Every Universal is Manganese Equipped

UNIVERSAL CRUSHER COMPANY, 327 8th Street, West, Cedar Rapids, Iowa



Pneumatic Caisson Foundations *New York*

Chase National Bank
The Foundation Company, Foundation Contractor

The sinking of these caissons for the foundations for the Chase National Bank, next to the Sub-Treasury in New York, is but one of seven large projects, under construction by The Foundation Company, where the pneumatic method is being used.

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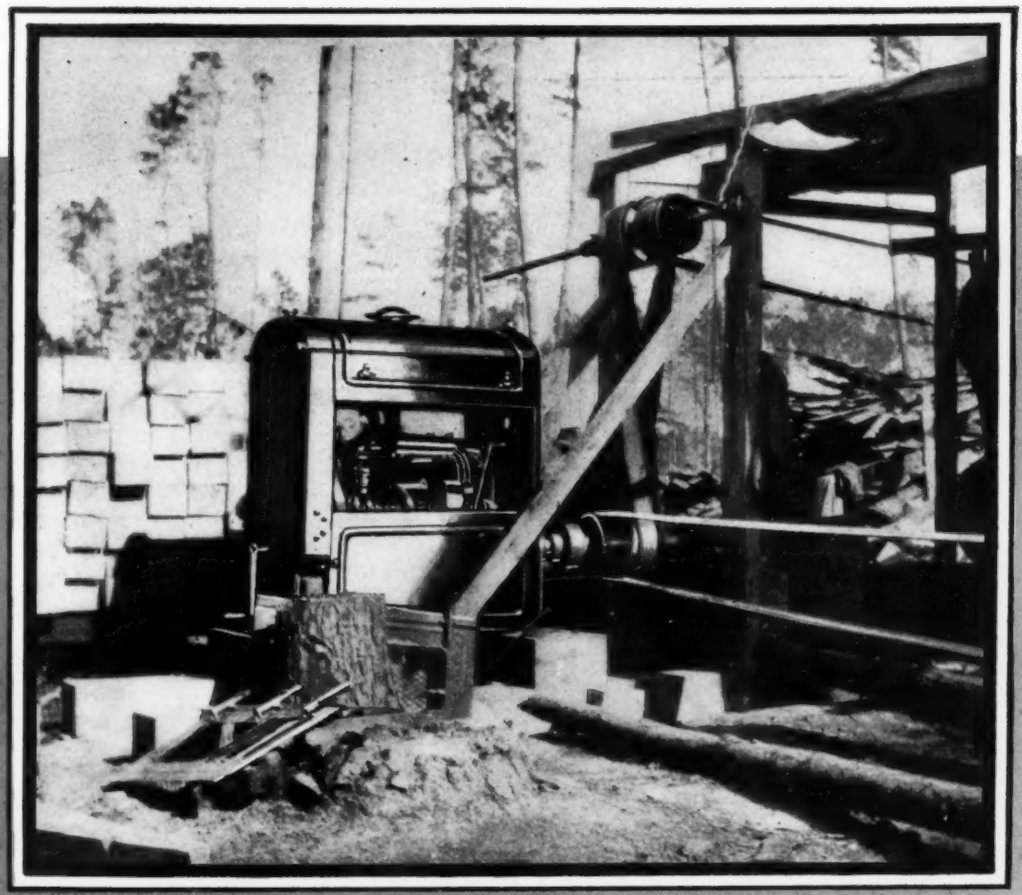
BUILDERS OF SUPERSTRUCTURES AS WELL AS SUBSTRUCTURES



HERCULES

Forty-three per cent additional capacity was the result of replacing the former power plant driving this Wheland Saw Mill with a standard Hercules Model "G" Power Unit.

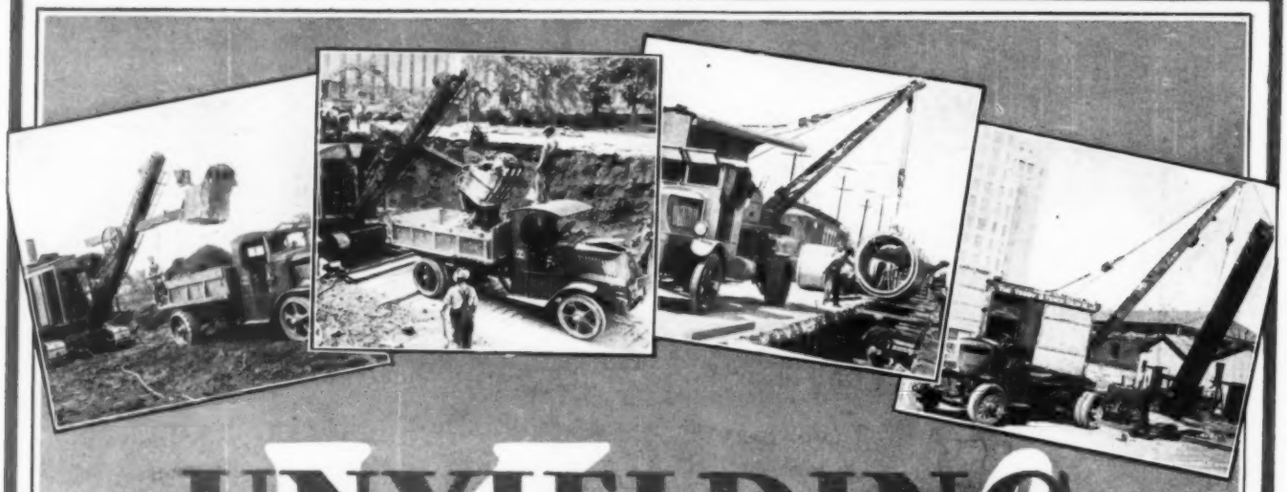
This increase in efficiency is indicative of Hercules' contribution to the industrial power problems of the country.

The installation shown here is owned by the Sour Lake Tie Company, operating at Batson, Texas. The average number of ties cut per half day before the Hercules was installed was 175. With the Hercules, 250 were cut.

It is by such performance that Hercules Engines, by the thousands, are proving their case—right on the job.

HERCULES MOTORS CORPORATION, CANTON, OHIO, U. S. A.

ENGINES



UNYIELDING POWERFUL DEPENDABLE

UNYIELDING — powerful — dependable — are the qualities bound up in the heart of a bulldog.

It must have been that those men who handled the first Macks strongly sensed the bulldog characteristics or they would not have voluntarily christened Macks the "Bulldogs" of the highway.

It was not until the name became generally popular that it was officially adopted by the Mack Company.

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway New York City

One hundred and four direct MACK factory branches operate under the titles of: "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION", "MACK MOTOR TRUCK COMPANY", or "MACK TRUCKS OF CANADA, LTD."

YOU NEVER SAW A BULLDOG QUIT